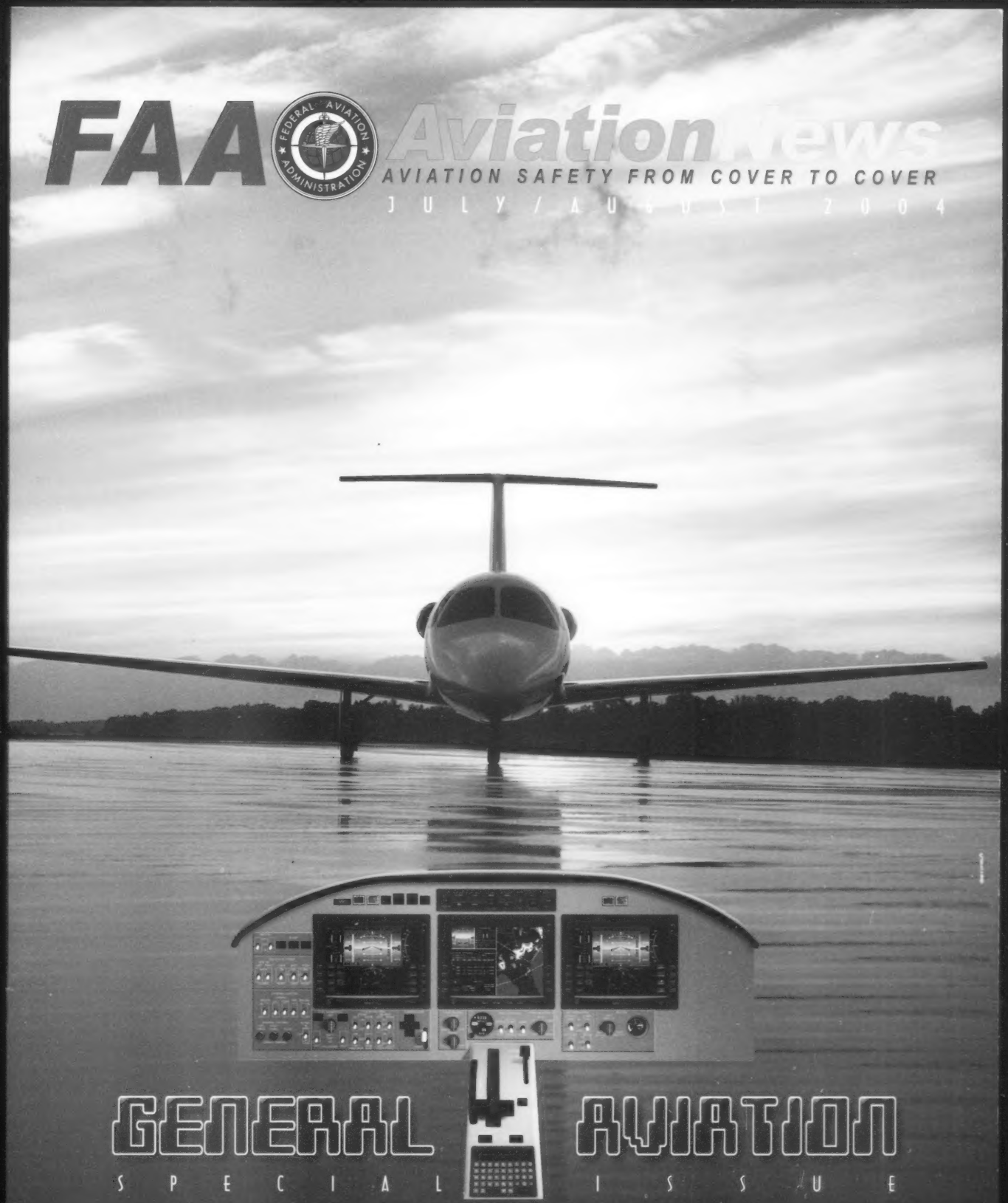
FAA Aviation News
AVIATION SAFETY FROM COVER TO COVER
JULY/AUGUST 2004



GENERAL AVIATION

SPECIAL ISSUE

U.S. Department
of Transportation

Federal Aviation Administration

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The FAA's Flight Standards Service, General Aviation and Commercial Division's Plans and Programs Branch (AFS–805) publishes *FAA Aviation News* six times each year in the interest of aviation safety. The magazine promotes safety by discussing current technical, regulatory, and procedural aspects affecting the safe operation and maintenance of aircraft. Although based on current FAA policy and rule interpretations, all material herein is advisory or informational in nature and should not be construed to have regulatory effect.

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JULY/AUGUST 2004

FAA Aviation News

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VOLUME 43 · NUMBER 4

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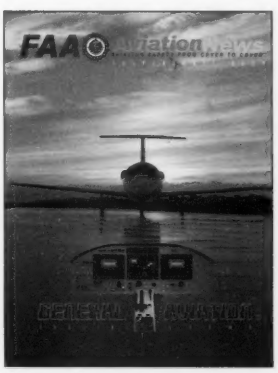


FRONT COVER: Photo montage depicting the Eclipse 500 *and the* Safire Entegra *panel. (photos courtesy of the manufacturers)*

BACK COVER: The Eclipse 500 *takes off. (photo courtesy of the manufacturer)*

SPECIAL ISSUE WELCOME

by H. Dean Chamberlain, Editor

On behalf of the *FAA Aviation News* staff, I want to welcome you to this special edition of the magazine. As you may have realized, this issue is different. It does not have our standard safety-related articles, regular columns, and normal departments. Our traditional format and features will return in the September/October issue.

Each year, we on the magazine's staff refer to this issue as the "Oshkosh" issue because we print extra copies of the magazine to support the FAA's safety mission at the Experimental Aircraft Association's annual convention and fly-in, AirVenture™. This year's special July/August "Oshkosh" issue is dedicated to the critical role training and education plays in aviation safety.

As aircraft technology and onboard systems advance, the training required to safely operate such aircraft must also advance. This special issue of *FAA Aviation News* provides you, our readers, a brief glimpse into how those inside and outside FAA view the future of general aviation (GA) training and operational safety. Aviation safety has two critical components. One is flight operations or the actual control of an aircraft from the moment of untying the aircraft for a flight until the moment it is properly chocked and tied down. The second component is all of those elements such as aircraft design, manufacturing, and maintenance activities critical to building and maintaining an airworthy aircraft.

This special issue will focus on the operational component with the emphasis on operational safety. The development of what is commonly called "technologically advanced aircraft (TAA)," and the recent upsurge in the GA accident rate, has raised the question of "Does the current training philosophies meet the needs of those pilots flying and buying today's TAA as well as those aircraft of the future?" The second issue is how to reduce the GA accident rate and continue to lower it in the future.

Those are but two of the many challenges facing those within and outside the government as they work together to resolve these as well as other issues facing GA this year and beyond.

As you read through this issue, the FAA Administrator, key FAA executives involved in aviation safety, and a few of those in industry responsible for the creation of new TAA aircraft, as well as the training required to safely operate the new TAA aircraft, all share their views and expectations for you.

I want to take a moment to thank all of those who contributed to the production of this issue, as well as those who made suggestions for its production. Thanks for a job well done.

It is my pleasure to present the Federal Aviation Administration's Administrator Marion C. Blakey on the following page as she discusses the importance of general aviation and flight safety. She is followed by leaders from across the broad spectrum of general aviation from regulators, educators, safety experts, and cutting edge manufacturers.

We have divided this issue into broad themes. These include editorial comments, vision statements looking at the future of general aviation (GA), the challenges facing GA, key stakeholders working with the FAA on critical GA issues, a listing of some of the tools being used or developed to contain and reduce the GA accident rate, a brief look into the future, and concluding this issue is a statement by the Flight Standards Service Director, Jim Ballough.

Welcome to our special "2004 Oshkosh" issue of *FAA Aviation News.*

(Cirrus photo)

Administrator's Viewpoint

Flight's Greatest Gift and Responsibility

In his book, *Inside the Sky,* pilot and writer William Langewiesche writes, "Flight's greatest gift is to let us look around, and when we do, we discover that the world is larger than we have been told, and that our wings have helped to make it so."

The world is larger … and nowhere is it larger, or more exciting, than at EAA AirVenture™. Every summer, Oshkosh is *the* place to be with so many people who are so enthusiastic, so committed to flying, but most important, so essential to aviation. And, that's because it is you, the people in general aviation, who are aviation's grassroots. You are vital to aviation, which, in turn, is so vital to the entire nation.

I'm delighted FAA is making this special issue of *FAA Aviation News* available for EAA AirVenture™ Oshkosh 2004. And I'm proud of the FAA volunteers who support EAA AirVenture™ in the FAA Safety Center, those in the tower and working the runways, as well as the Flight Service staff, the Aviation Safety Inspectors, and the many FAA professionals putting on safety seminars. The focus of this magazine and of FAA's participation in EAA AirVenture™ is exactly where it should be—on safety.

The FAA has charted its course for the next several years in its *Flight Plan 2004 – 2008*, and as you would expect our number one goal is to achieve the lowest possible accident rate and constantly to improve safety. In the United States, our accident record is very low for commercial aviation, but unfortunately of late, the trend has been in the wrong direction for general aviation. For all of us in general aviation, we can, and we must, do a better job. And that's exactly what we intend to do with your help.

Earlier this year, the National Transportation Safety Board (NTSB) issued its report on 2003 accident statistics. For 2003, NTSB shows 351 fatal general aviation accidents, up from 345 in 2002. To help us understand where we should focus our resources and energy to reduce the number of accidents, FAA investigates and tracks GA accidents closely. Our evaluation shows that among the biggest risks to safe flight are flying VFR in instrument meteorological conditions or flying VFR at night, or both—flying at night in poor visibility.

This is why we're focusing so many efforts on pilot awareness, education, and training. This spring, as we entered the busy flying season, we stepped up our pilot education efforts. These efforts include a revitalized Aviation Safety Program, which you can learn about at its new website: <www.faasafety.gov>. Here, pilots can sign up to receive information tailored to your level of experience and your location. And in the near future, you'll be able to find learning tools at the site's educational library. In addition, we're including signposts to safety information on the FAA's main website at: <www.faa.gov>.

We're also working with the general aviation community to target areas where we can make the biggest difference in general aviation safety. Steve Wallace, FAA's director of Accident Investigation, is serving as co-chair of the General Aviation Joint Steering Committee with Bruce Landsberg, executive director of AOPA's Air Safety Foundation.

Flight's greatest gift is opening up the world. Your greatest gift—and responsibility—is to learn, train, and fly as safely as you can and help others do so.

Marion C. Blakey
FAA Administrator

I LOVE TO FLY

by Nick Sabatini

Yes, I love to fly. And I get out whenever I can. One, I fly because it's fun. And, two, because I think it's important that the person responsible for overseeing the safety of U.S. aviation understands what it's like to fly in the system, and, just as important, what it's like to be licensed and overseen by the federal government.

So my name, along with some 750,000 other pilots, is on the FAA's Civil Aviation Registry. In addition, the registry maintains the records of more than 330,000 active civil aircraft. The FAA also oversees and regulates more than 1,500 manufacturers, nearly 6,000 flight schools and repair stations, more than 6,000 air carriers and other operators, as well as more than 500,000 non-pilot personnel (from mechanics to dispatchers to parachute riggers).

That's a big responsibility. What we do affects a lot of people—people who fly for recreation, people who make aviation their livelihood, and the millions of people who travel on airplanes. Our work has a huge impact on our nation's economy. Travel and tourism accounts for one out of seven jobs in America and is among the top three employers in 29 states.

So I take my job very seriously. And I want the FAA to get even better at meeting the challenge of assuring, and improving, the safety of the world's largest and most complex aviation system. I see a three-pronged approach to improving aviation safety: Excellence, knowledge, and collaboration.

One, excellence: Excellence, for me, is about organizational excellence. We must be *unrelenting* in maintaining our commitment to quality and *laser-like* in our focus on the areas where we know we can improve. We have introduced system safety to the airlines, which means risk management is integral and safety is built into the system. And, we've launched an initiative to develop a system safety approach for general aviation. At the same time, we're making sure we meet those same high standards.

Two, knowledge: We need more—and we need better—information so we can make higher quality decisions on where to target our actions to get the best safety benefit. We must work with the general aviation community to identify risks, develop ways to mitigate them, and get that knowledge out to the people who need it most—pilots. The Aviation Safety Program is one way to do that. Another way is the new safety website we've developed at <www.faasafety.gov>. The safety web site provides information on safety seminars and temporary flight restrictions, or TFRs. It also generates e-mail update notices to pilots who register to receive them.

And, three, collaboration: It's through collaboration when knowledge is shared in a constructive manner that we truly begin to realize benefits and enhance safety. Perhaps the best example of collaboration for general aviation safety is the FAA/Industry Training Standards program, or FITS. FITS was founded to address the training requirements of technically advanced aircraft. It's scenario-based training that trains the way you fly, so that you will fly the way you train. The FAA FITS team is working with Adam Aircraft, Cessna, Cirrus Design, Eclipse Aviation, and others to develop FITS for their airplanes. You can find out more about FITS at <www.faa.gov/avr/afs/FITS>.

These collaborative efforts are essential. We must evolve from the traditional role of regulator and regulated. Yes, FAA will always be the regulator, but it's through those three approaches to safety—excellence, knowledge, and collaboration—that we will continue to improve aviation's outstanding safety record.

One of the all-time classic books for people who love flying and aviation is Ernest Gann's *Fate is the Hunter.* Gann writes about flying in the early days when there was a greater degree of risk. Much greater ... the book is dedicated by name to hundreds of pilots who perished in aviation's early days.

Ernest Gann said fate was the hunter. In fact, fate has nothing to do with aviation safety. Aviation safety at the beginning of the 21st century is not about fate. Today, aviation safety is about dedicated professionals staying focused on doing our jobs well and working together to manage the risks.

And, with your help, that is exactly what we intend to do.

+

Nick Sabatini, who flies both airplanes and helicopters, holds an ATP and four type ratings. He is the FAA 's Associate Administrator for Regulation and Certification.

(Mario Toscano photo)

General Aviation Safety in the Second Century

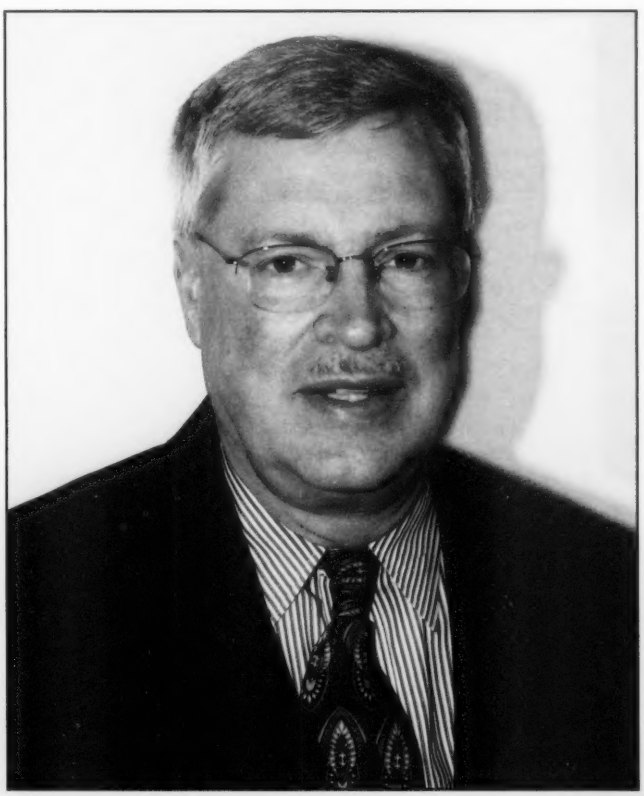
The Flight Training Challenge

by Robert A. Wright

General aviation came into its own during the last half of the twentieth century and became progressively safer as technology improved, operating practices changed, and flight training methods evolved. During the last two decades of the century, total and fatal accident numbers and rates steadily declined, reaching a low in 1999. The fatal accident rate, however, has since been creeping upward (see chart) and our safety results may be changing as a result of current trends in the general aviation community.

The Federal Aviation Administration (FAA) and the general aviation community have collaborated on safety initiatives through the Safer Skies program and have established ambitious goals for reducing fatal accidents in the period from 1998-2008. These goals may be difficult to achieve if the FAA and the community do not respond effectively and in a timely manner to both industry changes and historical and current trends in fatal accident causality. These changes include new aircraft technology including radical changes in flight deck technology and avionics, new procedures in the National Airspace System (NAS), and new approaches to aircraft use and ownership. The primary causes of fatal accidents continue to be maneuvering flight/loss of control, takeoffs/departures, and weather. Pilot-related accident causes continue to account for more than 70 percent of these fatal accidents in general aviation and human factor issues will become even more pronounced as a new generation of single-pilot piston- and turbine-powered aircraft enter the fleet.

With effective collaboration, the FAA and the general aviation community will meet this new safety challenge the same way it responded to the safety challenges following the huge growth in general aviation activity fol-



(Mario Toscano photo)

lowing World War II. Safety issues from that era were addressed primarily through changes in flight training methods, new flight technologies, and better operating procedures. In other words, the art and science of operating general aviation aircraft evolved to meet the changes that took place from the introduction of new products into a new operating environment.

The nature of the safety challenge we face today is somewhat different since a much larger portion of general aviation activity today is for transportation, both business and personal, rather than purely recreational purposes. The public has higher safety expectations for such activity and this demands a higher level of professionalism from operators, even if they are not operating for hire. This expectation will require a better record of performance by general aviation pilots in areas such as risk management, decisionmaking, single-pilot resource management, and maintaining situational awareness. To succeed in this effort, single-pilot general aviation operators will have to borrow heavily from the methods used by two-pilot operators of corporate aircraft, who have achieved an enviable safety record equivalent to that of scheduled airlines—without the extra regulations.

As a result of the changes described above, it may be time to reexamine some of our current flight training methods and practices, many of which have their roots in the flight training paradigm adopted during and shortly after World War II. That paradigm is heavily rooted in a maneuvers-based approach that assumed that a pilot trainee could learn how to "put it all together" after they completed flight training. There were some major changes in flight training regulations in the period from 1965-1973, but this maneuvers-based approach to flight training continues. Concepts such as scenario-based training may need to be added to create a balanced approach to flight training. Such concepts are not new. The airline community embraced them in concepts such as Line Oriented Flight Training (LOFT) and the Advance Qualification Program (AQP) and the military has also successfully used them.

The evolution in flight training methods, operating procedures, and professionalism described above will take place primarily as a result of actions taken by individual pilots and the flight training community (flight instructors, pilot schools, training centers, pilot examiners). The FAA and general aviation organizations can act as a catalyst for this change, but the evolution itself can only occur in the actual aviation operating and training environment. It will not take place inside the Washington "beltway."

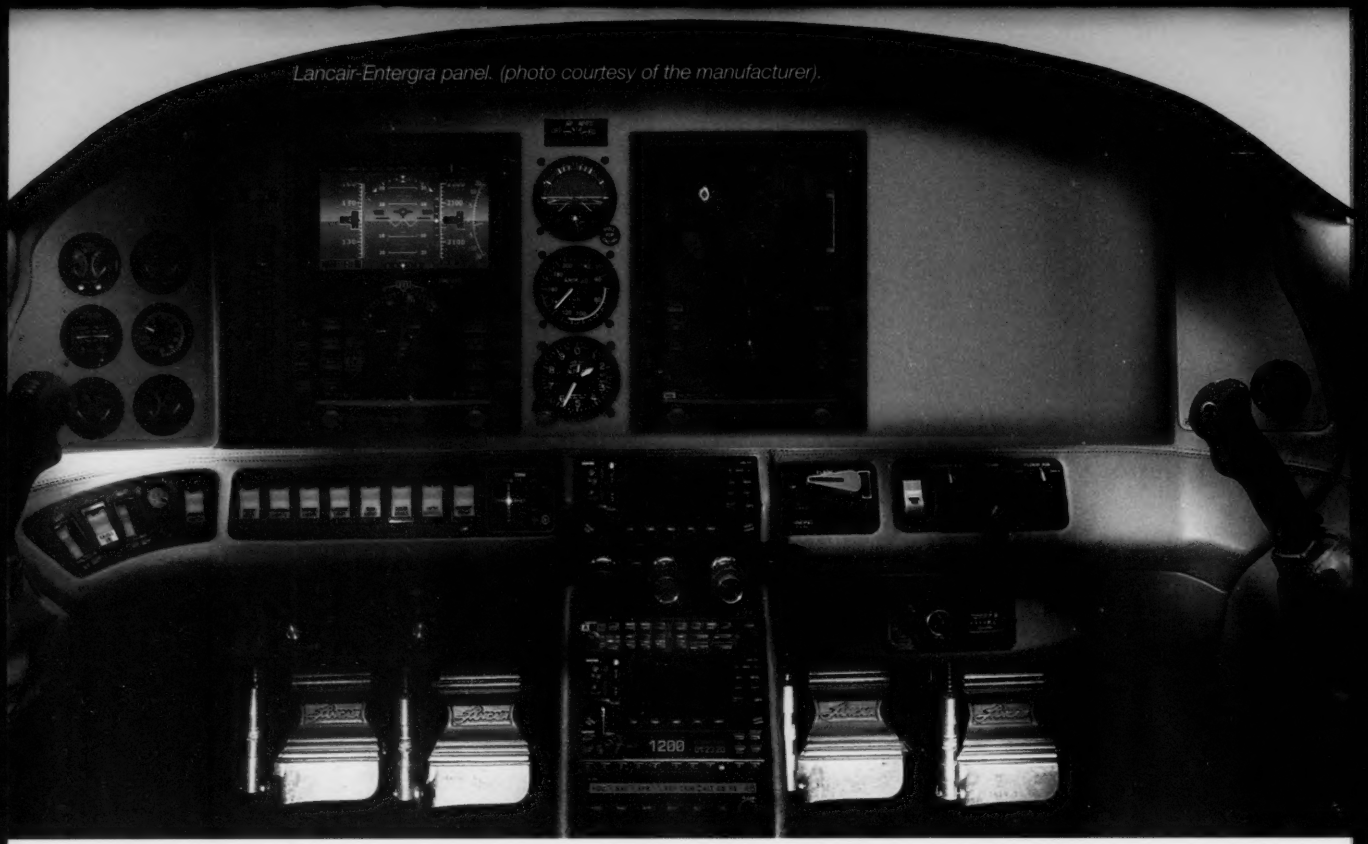
We have structured this issue of *FAA Aviation News* in a manner that will allow a variety of viewpoints to be heard. Many of the guest authors are directly involved in the flight training community and are respected voices in that community. We believe that a diversity of viewpoints is healthy in framing the discussion that must take place if we are to progress in reducing fatal accidents in the general aviation community and to lay the foundation for success in the second century of powered flight.

Robert A. Wright is the Manager of the General Aviation and Commercial Division. He is also a pilot and aircraft owner.

Accidents, Fatalities, and Rates, 1994 - 2003
U.S. General Aviation

	Accidents		*Fatalities*			*Accidents per 100,000 flight hours*	
Year	All	Fatal	Total	Aboard	Flight Hours	All	Fatal
1994	2,022	404	730	723	22,235,000	9.08	1.81
1995	2,056	413	735	728	24,906,000	8.21	1.63
1996	1,908	361	636	619	24,881,000	7.65	1.45
1997	1,845	350	631	625	25,591,000	7.19	1.36
1998	1,904	364	624	618	25,518,000	7.44	1.41
1999	1,905	340	619	615	29.246,000	6.5	1.16
2000	1,837	345	596	585	27,838,000	6.57	1.21
2001	1,726	325	562	558	25,431,000	6.78	1.27
2002	1,713	345	581	575	25,545,000	6.69	1.33
2003	1,732	351	626	622	25,800,000	6.71	1.36

Notes: This information is from the National Transportation Safety Board (NTSB) Aviation Accident Statistics web site at <http://www.ntsb.gov/aviation/Stats.htm>. The 2003 data are preliminary. The FAA estimates flight hours. Miles flown and departure information for GA operations is not available.



Lancair-Entegra panel. (photo courtesy of the manufacturer).

FAA/Industry Training Standards — An Improved General Aviation Training Paradigm

by Thomas Glista

Flight training within the general aviation (GA) community has reached a critical juncture. While the industry as a whole enjoys an admirable safety record, recent statistics show an increase in both total and fatal GA accidents. This fact, coupled with the proliferation of advanced technologies in new and older (traditional) small aircraft cockpits, has led the Federal Aviation Administration (FAA) to take a critical look at how pilots are trained.

Look into the cockpit of a traditional general aviation airplane or even a vintage aircraft and you're likely to see a panel-mounted GPS that incorporates a moving map display. In fact, most of the current major manufacturers of general aviation aircraft have, or plan to have, aircraft with full "glass panel" cockpit displays available. "Glass panel" refers to the aircraft's primary flight information (attitude, altitude, and airspeed) and the navigation information (your relative position to airports, navaids, airways, waypoint, terrain, and data-linked weather, etc.) being displayed on two flat panel video displays, the Primary Flight Display (PFD) and the Multi-Function Display (MFD) respectively. Though these technically advanced systems have previously been the sole domain of airlines and larger corporate jets, they will soon become the standard in new small single engine aircraft and the coming very light jets. In the past, GA aircraft cockpit displays, avionics and navigation equipment all looked the same and worked much the same no matter who manufactured the unit (i.e. a VOR head was a VOR head. You've seen one, you've seen them all.) Advanced technology systems and displays, on the other hand, look different and the way the pilot uses them may differ. Programming a KLN 90B will be different from a Garmin 430. Pilot interaction with the "full glass" Garmin G1000 will be different from the interaction with the "full glass" Avidyne FlightMax Entegra. This means a renter who checks out in a Diamond DA 40 with the Garmin G1000 cockpit may find the transition to an Avidyne-equipped Cirrus SR-20 may be a significant challenge. Today's regulations do not require a pilot to be formally tested or even have an instructor endorsement when transitioning from one of these airplanes to another. In order to maintain and increase flight safety, a change in the general aviation training culture needs to take place.

To understand why such a pro-

found change is needed, consider that flight training has changed very little since the dawn of regulated aviation. In fact, a private pilot trained to standards outlined in the Civil Aeronautics Regulations, circa the 1940's, would likely do quite well in most operations required by today's FAA practical test standards. This is because many of the basic skills needed to pilot an aircraft have changed very little. However, the development of new technologies and a rapidly evolving airspace system have outpaced current training methods. Moreover, the FAA and the flight training community now have over a century's worth of experience upon which to draw when determining how best to train pilots. While the military and airline communities have leveraged this experience, the general aviation community has been slow to make use of the lessons learned.

To that end, the FAA has partnered with industry to develop the FITS program. FITS, or FAA/Industry Training Standards, offers an improved training paradigm that embraces concepts such as risk management, aeronautical decisionmaking, situational awareness, and single-pilot resource management. The airlines, military, and corporate aviation (who have the best safety records) have embraced these concepts for years. Instead of treating each of these concept elements as a separate or stand-alone lesson, scenario-based training will be used to efficiently integrate these important concepts into every instructional exercise. The military uses the expression "train the way you fly and fly the way you're trained." This is the direction in which GA needs to move.

As a result of our current training paradigm, the vast majority of fatal GA accidents were found to involve a lack of situational awareness, risk assessment/management, and poor aeronautical decisionmaking. Pilot training standards focus less on these factors and more on the development of mechanical ("stick and rudder") skills. While such skills are vitally important, most fatal accidents are not a result of deficiencies in these skills. The FITS program is working to take the best practices of the airlines, military, and corporate jets operators, and tailor them to the GA environment, while increasing safety and convenience and reducing the time and cost of training.

Another factor in the genesis of FITS is the development of Very Light Jets (VLJ). These small (12,500 lbs or less) jets will be certificated for operations by a single pilot. There are many VLJs in various stages of development. These include the Adam Aircraft A700, ATG *Javelin*, Avocet *Projet*, *Century* Jet, Cessna *Mustang*, Diamond Aircraft *D-Jet*, *Eclipse 500*, *Honda Jet*, and *Safire Jet*. The relatively low cost of the VLJs combined with pilot-flown shared ownership options, may result in relatively inexperienced pilots transitioning from a light piston engine twin to a VLJ, each having substantially different operational capabilities. Except for an initial type rating, VLJs do not require an annual proficiency check (Title 14 Code of Federal Regulations §61.58). They only require the standard flight review required by 14 CFR §61.56. We believe that taking a flight review every two years in a Cessna 172 and flying off in your Cessna *Mustang* is not the safest way to operate. So the FITS team has been working with many of these VLJ manufacturers to develop valuable and appropriate training that "FITS" the requirements of the operator.

The FITS technical team has produced a series of generic training syllabi for piston airplanes-transition, recurrent and instructor. These, along with other FITS accepted documents, can be downloaded at <www.faa.gov/avr/afs/fits>.

We encourage flight instructors and pilot schools to use these generic syllabi to develop a FITS curriculum for their operations. To assist in the development of these syllabi, the FITS technical team is developing a FITS training guide and a course developer's guide for instructors and training providers. To apply for FITS acceptance, you must submit your syllabus to the FITS program manager. It must be understood that an operator can receive FITS acceptance on any syllabus if it adheres to the FITS tenets. It must also be understood that an operator is not required to use the generic syllabi the FITS team developed. We developed them as a tool, not as a requirement. The FITS web site contains guidance that includes FITS acceptance criteria. This contains the FITS tenets the FITS technical team is looking for when evaluating syllabi for FITS acceptance.

There are other products and tools currently under development by the FITS team. These include transition, recurrent, and instructor syllabi for VLJs; new flight review guidance to provide instructors the tools needed to conduct a customized flight review (which should supercede the 13-year-old AC 61-98A, Currency and Additional Qualification Requirements for Certificated Pilots); web-based instructional resources covering aeronautical decisionmaking, controlled flight into terrain, weather, and runway safety. These may be applied toward a new "WINGS" option. Standards for developing avionics training; integration of FITS into the Flight Instructor Refresher Clinics; and FITS program information focused toward FAA inspectors, designated examiners, and flight instructors are also under development.

As the FITS program manager, I have worked closely with the FITS Technical Team and industry partners. The information regarding FITS has been reaching the industry. However, there still seems to be some confusion over what FITS is and what FITS isn't.

First FITS is NOT a requirement. The program works within the current regulatory framework leaving training providers to decide if FITS is appropriate to their needs. The FAA's overriding goal is to make FITS benefits driven. Those flying TAAs, can look forward to better training through the availability of more knowledgeable instructors. Pilots of traditional aircraft will also realize a benefit resulting from training that more faithfully replicates the way they fly.

FITS training can help keep insurance costs at manageable levels. Traditionally, when new aircraft and/or

The new Piper 6X can be ordered with Flight Max Entegra *system with its two flat panel displays. (photo courtesy of the manufacturer)*

technologies enter the market, insurance companies have a difficult time assessing potential risk, a major determinant in establishing rates. Because GA lacks a regulatory requirement for structured transition or system-specific training, insurance companies are often forced to mandate certain conditions in order to write policies. This usually translates into expensive, often burdensome, experience (time-in-type) requirements. Also, because much of the training is not well structured, the pilot receives minimal benefits from the additional instruction. This is clearly a disservice to the owners/operators of such aircraft/avionics systems and has the undesired effect of discouraging pilots from investing in new technologies. By offering a FITS alternative, pilots will receive the training they need in less time, and with less expense. Insurance companies, recognizing the benefits of such FITS training, will be in a position to offer lower rates. This is because insurance companies recognize and reward structured training that addresses the causal factors associated with many GA accidents, regardless of the aircraft type.

FITS tenets and philosophies are NOT new. What the FITS program does is take the best training information from the safest operations and applies it to general aviation. Risk management has been around for many years. Insurance carriers have been assessing and managing risk for several hundred years to set rates and to find ways to mitigate financial and other risks for their policyholders. The airlines have also been using risk management for many years.

Aeronautical decisionmaking (ADM) goes hand-in-hand with risk management. Pilots must have the ability to assess a situation and make sound decisions to lower the risk to an acceptable level.

We have all heard of CRM (Cockpit Resource Management or Crew Resource Management). Air carriers are required to teach CRM in their initial and recurrent training programs (cockpit crew, cabin crew, and dispatchers). Single Pilot Resource Management (SRM) brings these principles to the single-pilot GA environment. Even in single-pilot operations, there are resources available that must be managed. For example, a non-pilot can help scan for traffic and arrange charts, Flight Watch can keep the pilot updated on changing weather, Flight Following provides radar services, and full use of the autopilot (if installed) may free the pilot to perform other cockpit duties.

Situational awareness skills have also been needed from almost the dawn of aviation. Whether you are VFR into an uncontrolled airport or IFR en route flying through clouds, situational awareness is a critical tool for safe operations. With GPS, moving maps, data link weather, etc., situational awareness is more intuitive, but with it comes possible problems. With all this information prominently displayed, a pilot may become more comfortable flying closer to hazardous weather or terrain without using the proper situational awareness and risk management techniques.

The operators with the best safety record have demonstrated that scenario-based training is an excellent way to develop skills in risk management, ADM, SRM, and situational awareness. Airlines have been doing scenario-based training for many years. They call it Line-Oriented Flight Training (LOFT). LOFT training in airlines has been going on since the 1970s. The military calls it sortie training. Military pilots train for the job they do. In the same way, a general aviation pilot should train for the operation he or she conducts. If you fly for pleasure on the weekends, such as taking your spouse and child to a nearby airport for lunch (the $100+ hamburger flight), then the training you have always received is probably the training you will need in the future. However, if you are flying a new technology glass panel airplane (i.e. Adam-500, Cirrus SR-22, Eclipse 500, DA-40, Lancair *Columbia* 400, etc.) on long cross-country flights for personal or business transportation, then your training should support that need. Fly the way you're trained and train the way you fly.

FITS is intended to raise the level of aviation safety by improving the quality of flight training. FITS will make flying safer, less expensive, and provide more practical training for the general aviation community through the development of value-added programs and new instructional resources. Not only will these systemic improvements reduce accidents, but they will also help acclimate pilots to the rapid pace of technological advancement that will surely be the norm in coming years.

For additional information on FITS please visit the FITS web site at <www.faa.gov/avr/afs/fits>.

Thomas Glista is an Aviation Safety Inspector in Flight Standards' General Aviation and Commercial Division and leads the FITS program.

Challenges in Aviation:
Embracing New Technology

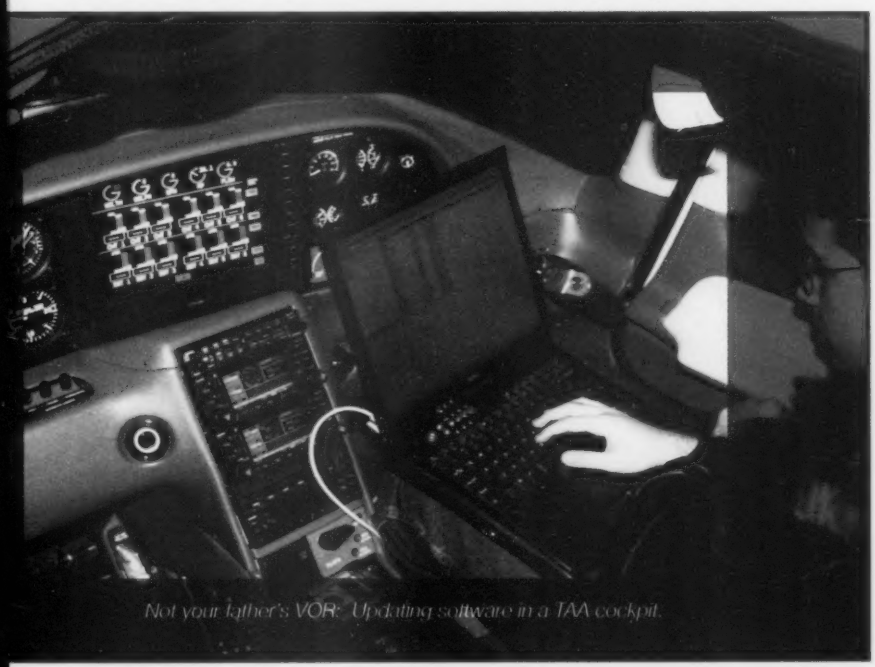
story and photos by Michael Radomsky

When I learned to fly in Port Elizabeth, South Africa in 1975, life was very different from life in these United States in 2004.

Then, on my way to the airport, I might stop at the Post Office to drop off mail — the "old" way, in an envelope, with a stamp. After parking my car at the Algoa Flying Club, I'd climb into a dilapidated, 1960 Cessna 172A. The vacuum system (powered by a Venturi tube on the side of the airplane) never failed, but it never really worked very well, either. "Coffee grinder" controls were state-of-the-art on avionics when ZS-FPX was built.

A lot has changed since then in day-to-day life and in aviation. There are some interesting parallels between the two evolutions and some important differences.

Today, most of us use e-mail. "Snail mail" has its place, and we use it when we must, but technology has had a major impact on the postal service. At some point, those of us old enough to remember "life-before"-e-mail went through a process of upgrading our mailing skills and coming to grips with the new technology. Even as we learned it, the technology became less arcane, more intuitive. As more of us learned the skill, we became teachers, helping others overcome the hurdles, which for some included outright fear of technology.



Not your father's VOR: Updating software in a TAA cockpit.

These days even young children are completely at home with e-mail, and communications relatives like instant messaging, chat rooms, etc. They behave as though computer comfort is an instinct, a birthright.

Has our aviation progress paralleled the evolution of our day-to-day lives into the Brave New World of High Technology? Yes, but with considerable lag.

Today's airplanes boast avionics installations that would have been unrecognizable—almost Martian—when I flew that 172. Airplane panels have certainly changed, and today one would be hard-pressed to find a GA pilot who has not salivated over the latest technology—GPS with moving maps, with overlaid traffic reporting systems, satellite weather, storm tracking, and more. All of this innovation is pervasive, and we recognize that "this changes everything," so we've given the new breed a new name: Technically Advanced Aircraft (TAA).

TAA offers amazing functionality while presenting GA with a training challenge that may be our greatest yet. Unlike the transition from "snail mail" to e-mail, any misstep in our transition from "steam gauges" to TAA can have serious, even deadly, consequences.

I read and participate in a lively aviation discussion every day, on an Internet forum, with other members of the Cirrus Owners and Pilots Association (COPA). This is an extremely active pilot group; it's my impression that our members fly a great deal more than average. COPA members can be quite vocal, discussing every aspect of Cirrus and other Technically Advanced Aircraft. Praise for the new, "wiz-bang" technology abounds—but it is accompanied by plenty of thoughtful, compelling commentary on the challenges presented to pilots who choose "the new way." No doubt, this group has influenced my impressions.

There is now a new task to attaining and maintaining proficiency in a modern airplane. In addition to stick-and-rudder skills, radio communication skills, and all of the "traditional" skills requisite to being a safe aviator, there's a new kid on the block—computer skills.

It may not be obvious at first that the pilot of a 21st century airplane needs computer skills, any more than one might realize that one needs "computer skills" to program the family VCR. But in both cases, there is at least one computer at the heart of the machine.

TAA panels stand at an important threshold. Modern avionics already deliver on much of their potential, and there's clearly more to come. There is practically no end to the stream of new ideas that flow from the fertile minds of TAA pilots who post imaginative suggestions on our forums each day.

The real challenge lies not in the expansion of features, but in making the computer effectively disappear, or at least blend in seamlessly. An older VCR with its blinking "12:00" on the clock is a virtual caricature of the needless complexity for doing something as simple as setting the time. More modern VCRs have brought simpler operation. We're learning the same lessons with our modern panels: Simplify.

As I reached for the OBS knob, I hit a bump and switched off the Avionics Master!

Meanwhile, pilots will have to deal with whatever "knobology" it takes to make our avionics work as intended. Those transitioning from conventional panels, however, deal with the reality that equipment from manufacturers like Avidyne, Garmin, Bendix/King, Rockwell Collins, etc., all have their own look and feel. Like early computer programs from the DOS era, they provide potential benefits only to the "gurus" who know the intricacies. What are the odds that the average CFI is conversant with all these different boxes? Not good.

Yet we must somehow learn them. New technology brings with it new potential pitfalls, and we'd better know how to recover. For example, consider this account of an experience I had a couple of years ago.

I was flying a Cirrus SR20, being vectored to intercept the localizer for the ILS RWY 06 at Trenton, NJ. Just as my hand was poised to adjust the OBS, I encountered turbulence, and I bumped the Avionics Master switch. All the screens went dark. It took me only a second to flip the switch again—but the computer-driven screens took a few seconds to "boot" (surprise!), and when they came back, my active flight plan had disappeared. Fortunately, I'd "saved" a copy, and had a backup list of my waypoints written on my kneepad, so there were no serious consequences.

Scenarios similar to this one lie in wait for any TAA pilot; the well-rehearsed pilot will deal with the situation easily.

Some instructors are coming to grips with the new technology enough to be able to teach it to new pilots with some authority, but there's a significant lag. Relatively few pilots—usually those who own or operate one particular airplane type—may belong to a user/owner group that provides a lot of support via the Internet and airplane-specific proficiency seminars. But too many pilots, including many who rent or fly less frequently, may be less diligent when it comes to familiar-

izing themselves with their "boxes." They may have only a vague understanding of their avionics—a potentially dangerous situation that I believe has already been a factor in some fatal accidents.

We're going to be in this situation until the technology becomes simpler and more intuitive to use. In much the same way as Windows made software much more accessible to computer users (one no longer had to be a DOS "guru" to run a program), modern avionics will have reached its next important milestone when a pilot can perform all necessary tasks on a "new" (to him or her) box, without ever having seen it before and without opening a manual. In this regard, the VOR, ADF, or even the now-ancient A-N Range offered a major advantage over the modern systems—if you could work one, you could work them all. Just like anyone could send mail when I was a kid.

So we find ourselves learning interfaces that are too complex for many, on equipment that offers functionality unimaginable for GA airplanes only a decade ago. At the same time, I believe that the technology is moving toward a goal: A unified interface, so intuitive that any pilot will feel comfortable operating any piece of avionics with only minimal study.

When that goal is reached, manufacturers will be distinguished by the value of their products measured by price and functionality, instead of by today's all-important consideration: How difficult is this thing to operate?

With flying a much more user-friendly activity, more pilots will fly, and take on more challenging missions. If we get it right, our safety record will improve significantly, as TAA technology finally manages to reduce workload and really enhance the capabilities of the average GA pilot.

And a new generation of pilots will wonder. Why was learning new avionics so darned difficult for those old-timers?

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Michael Radomsky is the President of the Cirrus Owners and Pilots Association.

(Cessna photo by Darin LaCrone)

This Changes Everything!

by Kirby Ortega

With these words Cessna launched it sales efforts introducing the 2004 *Skylane* and *Stationairs* with the Garmin G1000 avionics suite. This happened in Orlando, Florida in October of 2003 at the sales meeting of Cessna Sales Team Authorized Representatives. Since then almost 500 G1000 equipped Cessnas have been ordered for delivery in 2004.

The G1000 is a fully integrated flight management system (FMS). Integration includes all communication, navigation, flight planning, engine, and systems monitoring. Other than an autopilot and standby analog flight instruments outside of the system, there are no additional outside boxes, switches, or gauges. It is truly an integrated system. A system such as this simplifies the pilot's workload as it centralizes functions with fewer knobs and buttons than traditional systems. More importantly is the fact the G1000 brings jet-like avionics to today's single engine, piston-powered airplanes. For example, the glass-screen presentations have two control display units (CDU). The left screen is designated as the primary flight display or PFD. The right screen presentation is the multi-function display or MFD. And like flying a jet, the pilot should receive familiarization training to become fully aware of the G1000's operation and functions.

Cessna decided with the introduction of the G1000 a new approach towards transition training was needed. The FAA has developed, in cooperation with several leading aviation universities, a program known as the FAA/Industry Training Standards or FITS. The basic philosophy of FITS is twofold with scenario-based training and learner-based grading. Typically flight training is tasked based with proficiency graded on allowable deviations and margins of error. With FITS, scenarios are incorporated into the flight training with a number of flights used to meet the training objective. FITS incorporates the use of desired

(Cessna photo by Darin LaCrone)

pilot scenario training and learning outcomes to determine pilot proficiency and level of understanding.

Cessna offers G1000/FITS training to all customers who have purchased G1000 equipped *Skylanes* and *Stationairs* at its factory in Independence, Kansas. The training course is based on a curriculum that includes instructor led discussions of the G1000 system, as well as a review of the aircraft systems. Depending upon the pilot's ratings and the airplane's equipment, the flight training includes a minimum of two, but no more than four scenarios. The flight scenarios are a VFR and IFR flight, abnormal and emergency operations, and if a turbo-charged aircraft was purchased, a flight at high altitude. The time commitment required to reach a comfortable level of proficiency is based on the pilot's adaptation to the system. Based on average pilot proficiency, an estimated six hours of training is needed to complete all four flight scenarios.

The G1000 system consists of the use of an attitude, heading, and reference system or AHRS for the primary flight display. It also uses an air data computer or ADC for airspeed, altimeter, and vertical speed along with other functions. The display screens are liquid crystal (LCD). A Traffic Information System (TIS), Terrain Awareness (TA), and a weather avoidance system enhance situational awareness. Flight automation is provided by a two-axis autopilot with a number of lateral and longitudinal commands. The autopilot is literally the heart of the system as it now allows the single pilot to act as a manager of the aircraft systems and maintain a higher level of flight awareness. Designed into the G1000 is a unique method of flight planning with departures, arrivals, and terminal operation programmed into the units. All of it can be controlled from the PFD by manipulating a single knob and button. As a matter of human engineering, the pilot can tune frequencies, select headings and altitudes, change course and baro settings, and modify flight plans with the use of only the right hand. The co-pilot or flight instructor can do the same using only the left hand. With all these functions occurring centered between the CDUs, it eliminates any hands crossing the screens, and a pilot will never have to release the control yoke to attend to these functions.

In the areas of system reliability and redundancy, the Garmin has many levels of safety in the event of "what if?" There are two of the following—GPS, VHF nav and com, glideslopes, composite screens in reversionary mode, analog audio back up in the event of digital audio panel failure, and a host of additional inputs within the system itself to maintain integrity. A loss of the primary electrical system is addressed by the automatic activation of the standby electrical system. Auto load shedding will power only items on the essential bus and provides for at least 30 minutes of endurance allowing the pilot to choose the best course of remedial action to maintain the safety of flight. In the highly unlikely event of an electrical fire, and worst case in instrument metrological conditions (IMC), the pilot may be forced to power down all electrics by shutting the master switch off. This would cause the pilot then to use the standby analog airspeed, altimeter, and vacuum-powered attitude indicator for a letdown to VFR conditions. There is still value to be found in old technology.

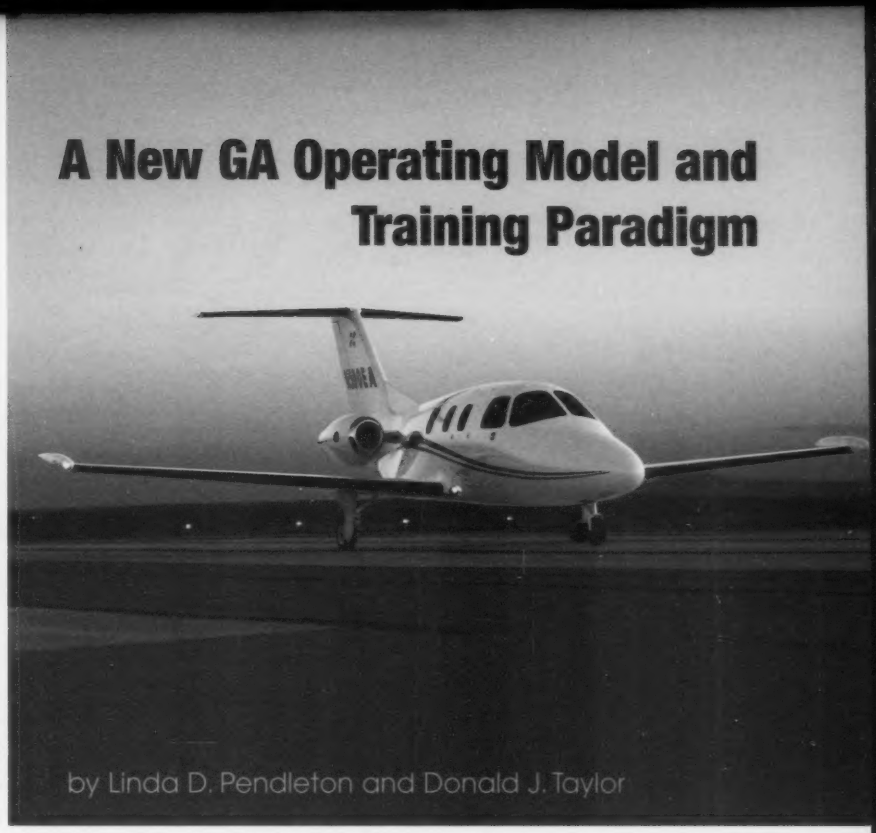
Failure of the AHRS results in the use of the standby attitude indicator. Failure of the ADC requires use of the standby airspeed and altimeter. Failure of the magnetometer is solved by use of the track or TRK on the GPS or magnetic compass. Upon failure of any CDU, the system automatically selects the reversionary composite screen on the opposite functioning CDU. In the worst-case event, failure of both the AHRS/ADC and the PFD requires the IFR pilot to fly a non-precision approach using the standby instruments and the moving map display on the MFD. Limited rate-based autopilot functions remain to assist the pilot however in this case. This worst-case scenario is still a safer event than the traditional no gyro, ATC assisted partial panel approach. The failure of any of the mentioned components exists, but it is very highly unlikely.

Systems monitoring is accomplished through the use of an Engine Indicating and Crew Alert System or EICAS. All critical engine parameters are monitored and if a problem occurs it is annunciated on the PFD in the form of an aural tone, message tag and either noted as a warning, caution, or alert message. GPS integrity and airspace alerts are also part of this package.

The end result of the emergence of glass in the GA cockpit is safety. With the reliability of the system, the many levels of redundancy, increased situational awareness in a number of flight regimes, and the emphasis on automation, greatly increases the overall safety of the flight. The challenge still remains the human factor. The training of pilots to use this type of equipment requires the use of a different training venue. FITS and the original equipment manufacturer's (OEM's) input will allow for transition courses to be developed with a new approach in marrying pilots and systems such as the G1000 together in a positive and educational manner.

Kirby Ortega is the Flight Training Supervisor of the Air Transportation Department at Cessna.

A New GA Operating Model and Training Paradigm



(Eclipse photo)

by Linda D. Pendleton and Donald J. Taylor

The way we have trained pilots in the past just won't work any longer. The system is broken and the sooner it is fixed, the sooner we can improve the accident statistics. Fully 85% of the general aviation accidents are attributable, at least in part, to pilot error, and yet avoidance of these errors and enhanced judgment is the one subject we don't adequately teach. There are test-prep courses that teach students how to pass a multiple-choice test. That's working so well that students have been known to finish the private pilot knowledge test in five minutes or less. We take students to the practice area and drill them at length until they are able to do perfect turns around a point and S-turns along a road. When was the last time a pilot was killed because the turn around the point was less than perfect?

We need to be spending the time with students emphasizing decisionmaking skills and higher order thinking skills. Maneuvers will still need to be taught, but they should be just a prelude to the main task of forming a capable and safe pilot. To be sure, there are some computer-based products that purport to teach judgement under the guise of risk management, but so far, the answers to the questions posed are transparently obvious and little new or helpful material has been supplied.

We train general aviation pilots for sport flying. With the advent of technically advanced aircraft, we should be teaching them skills that will be useful when flying a modern machine designed for transportation, not for short hops for $100 hamburgers. They will need a lot more practical education than we have given to date.

It has been suggested by some that the training be given over to the traditional folks who train the pilots of the current corporate fleet. After all, the missions are similar — why not the training? Because it just won't work. Putting a pilot in a $20 million dollar simulator and hitting him with a fire hose of simulated emergencies just isn't going to work with the new generation of GA pilots. It just wears out the simulator and irritates the pilot. It has worked for the corporate fleet because by the time a pilot has the experience to be handed a multi-million dollar jet, that pilot has, by process of elimination, formed fairly good judgement—or is really lucky—since the intrepid aviator has survived long enough to get the

The Eclipse 500 (Eclipse photo)

job. For the most part, these pilots have been successful despite their training, not because of it.

Our new crop of pilots using technically advanced airplanes and very light jets must be taught the skills that will keep them alive in a manner meaningful to them. The necessary systems knowledge can be supplied as self-paced, computer-based training that the pilot will master before flight training. It makes little sense to tie up pilot and instructor time to lecture a class on material that can be adequately studied at the pilot's convenience. It's also ridiculous to have pilots memorizing mounds of trivia such as temperatures, pressures, and numbers of holes in speedbrakes. Classroom time should be devoted to review and facilitated discussions on the impact a failure of any one system would have on the mission profile. Selected accident reports can be introduced for discussion of the error chain that leads up to most accidents and pointing out the actions that could/should have been taken to break the chain.

Simulator/flight training device/flight training sessions should be scenario-based with the pilot planning the mission profile given parameters supplied by the instructor. Simulation is ideal for this type training because the missions can be taken to their conclusion even if that would result in a crash. Obviously, in flight training, the instructor will have to intervene before that point. The pilot can be shown powerful evidence that faulty decision-making leads to most accidents. Not all possible problems or malfunctions will be revealed to the pilot prior to take off. Scenarios should be developed so that there are multiple paths depending on the pilot's decisions. At times, the pilot will be left with a choice between equally unattractive alternatives and will be forced to select the one that has the marginally best chance at success.

It is not necessary that every bell, buzzer, light, and warning message be activated during this training. Those items can be adequately drilled and reinforced in ground school and self-paced study. We should also not attempt to make pilots into mini-mechanics. Eastern 401 with three pilots trying to fix a light bulb or Alaska 261 with pilots trying to figure out malfunctioning flight controls come to mind. Any time the pilot steps out of the role of captain of the ship to do another job—especially one not adequately prepared for—disaster lurks. The pilot's "trouble-shooting" skills should be limited to taking care of the current problem via the checklist and then deciding whether to land or press on. Any further trouble-shooting has the potential for disaster. The pilot can do precious little from the cockpit other than fly the airplane and that job should be done with precision and proficiency.

Why hasn't all this been done in the past? Partially, it's because of the way we have thought of the pilot population. There are the "professional" pilots who fly jets in the flight levels and then there are the GA people that fly for fun down in the lower elevations. That no longer is true. GA pilots are using increasingly sophisticated equipment to accomplish transportation in the flight levels. Professional needs to be considered as an attitude toward flying, not the source of the paycheck.

Additionally, developing this training is very labor intensive. It's far easier to build a syllabus with a set of maneuvers and a test standard with those same maneuvers and set tolerances. When we start talking about judgment skills, the metrics become a bit fuzzy and take more thought to develop and judge. Multiple-choice tests have always been easier than essays—they are easier to develop, easier to train for, and easier to evaluate. Nevertheless, the essay more validly explores the testee's knowledge.

The final objection to this type of training stems from the "I-had-to-pay-my-dues-for-20-years-to-fly-a-jet-and-you-should-have-to-also" crowd. There is much gnashing of teeth and wringing of hands over amateur pilots in the flight levels. Get used to it. They are going to be there, and if we improve training, they could be the best-trained generation of pilots we've had since the military trained all of those pilots during World War II.

Linda D. Pendleton, Flight Training Manager, and Donald J. Taylor, Vice President of Safety, Training, and Flight Operations, are with Eclipse Aviation Corporation.

(Garmin photo)

Flight Training With Advanced Avionics

by Jerome Greer Chandler

The advances made in digital avionics and all-glass cockpits are starting to filter down into training aircraft. But is this really the best way to teach basic navigation techniques to students? Like it or not, primary flight training is increasingly being driven by modern avionics. Some flight schools embrace the trend. Others are leery.

Once the province of commercial and private jets, Global Positioning Systems (GPS), moving maps, TCAS, and other exotica are ending up in the cockpits of general aviation aircraft—changing the way students learn to fly and challenging hard-won wisdom.

GPS units are the most prolific pieces of equipment. GPS "just makes flying small airplanes in weather and cross-country much, much simpler," says Don Robb, president of AV-ED Flight School in Leesburg, Virginia, the state's largest training facility for private pilots.

Robb, whose company will be taking delivery of a Diamond fitted with a Garmin-1000 system, says what GPS gives students is crucial geographic orientation. "They can see where they are on the moving map. In the old days, with the VOR, you had to constantly visualize where you were. You had no picture to look at."

Pictures are nice, even while flying VFR. But it's when the weather gets rotten that the new gear can really prove its worth, when you're trying to think with one half of your brain and fly the airplane with the other.

"The heaviest possible load you can put on a pilot is single-engine, low-altitude IFR," says the veteran flight instructor. New navaids, specifically GPS, can make things lots easier.

"I don't think any of us really comprehend the sophistication of the equipment and the things that it will do for us," echoes Charlie Priester, owner of Priester Aviation in Chicago. In addition to running a charter business, he's been an FAA designated flight examiner for 30 years. Priester applauds the ability of GPS to enable pilots to shoot more approaches to smaller airports, to accomplish more straight in approaches, to better align with the wind. And, should your altimeter fail, GPS "will accurately tell you—within feet—what your altitude is."

GPS and other high-born avionics are, "making piloting easier," says Robb, "and available to more people." But available at what price?

Back to Basics

Leslie Erb is old school. He believes too many novice pilots are becoming far too dependent on advanced avionics, that that's part of a potentially perilous price the industry is paying for embracing the new and discarding the old.

The president of Centralia, Illinois-based Airgo is a self-professed "big believer in teaching the basics—primarily dead reckoning flying." And, the past chairman of the National Air Transportation Association's Flight Training Committee believes in teaching it without resort to radios.

Once students master the clock and compass technique, Erb contends it's easier for them to layer on the skills associated with other techniques. He believes in positioning carts before horses—fundamentals before what he considers frills.

Airgo's training fleet is sturdy, but not saturated with sophisticated gear. It consists of four Cessnas, only one of which—a *Skyhawk*—is GPS equipped. His 150s and 152s have VORs and ADS transponders—the basic navigation system that's been extant for the past 40 years. "It's what all the airways are depicted on," he says. "VORs control all the federal airways." He says he never would have retrofitted the *Skyhawk* with GPS had it been delivered without one.

He concedes GPS is "very helpful in shooting approaches at small airports that don't have another instrument approach system." But he considers the satellite-based system an adjunct, a supplement to VOR-based navigation and dead reckoning.

He contends making GPS the primary navigational tool is asking for trouble. What happens, he asks, if you're piloting a single-engine air-

plane, equipped with a single alternator and that alternator fails? You're in the weather, IFR. In that case, "all you have left is a watch and a compass. And if you don't know dead reckoning, you're pretty much helpless."

Erb reasons that if a student hasn't mastered this most time-honored of techniques he/she has no business being an instrument pilot, no matter how sophisticated the navaids on the airplane.

Charlie Priester too is a believer in taking things one-step at a time. He calls for a revision of the training curriculum for private pilots, one which is divided into two parts. Part A would be stick and rudder. Airmanship 101. Once that's done comes Part B. "Now that they can operate the machine, let's train them to operate the aircraft and its equipment." He calls the new gear the "magic" in the system.

The result, he believes, would be pilots who can fly "without reference to the magic."

Magic Land

As far as general aviation training is concerned, Murfreesboro, Tennessee, just might be the magic kingdom.

Murfreesboro is home to Middle Tennessee State University, and its cutting-edge Department of Aerospace. This is a large operation: 28 aircraft, 25 of which are dedicated to an FAA-approved Part 141 flight-training program.

While attending MTSU, students can enroll in a four-year "Professional Pilot" curriculum—progressing through private, instrument, commercial, and multi-engine ratings.

A little over a year ago, MTSU cleared its hangars of a collection of solid, but conventional, Cessnas and Beechcrafts. Financed by a state revenue bond, the university acquired a fleet largely composed of single-engine Diamond DA-20s and DA-40s.

When that happened, "we went from straight VORs and ADFs with pointers and needles," to a fleet outfitted with dual Garmin 430 systems says Paul A. Craig, PhD, MTSU's chairman of the Department of Aerospace.

The Garmin 430 is a GPS rig replete with a moving map that stores data-bases for airports and can calculate courses.

Craig's rationale for taking MTSU's airplanes from the realm of strictly round dials to digital was: "Here we are at a major university—one which is actually larger than the better-known University of Tennessee. What would it be like if you walked into a computer lab, and it was filled with computers from 1979? We'd be a laughing stock if there were all Commodore 64™ computers in that lab."

Part of the Department of Aerospace's mission is to produce commercial airline pilots. "We had to bring the technology up to standard," says Craig, "because our graduates were leaving our airplanes and—in one step—going from a round dial airplane to the right seat of a regional jet, fully glass. And that," says the 22-year aviation veteran, "is a big step."

A step best paved, so he reasons, with glass.

MTSU made a major move converting its primary flight training fleet to GPS-equipped Diamonds. But it's about to make an even bolder one as it accepts delivery soon of a Diamond that's fully digital, an airplane whose conventional analog instruments give way to an electronic environment designed to teach students to fly without any reference whatsoever to conventional instrumentation. The airplane, the first of five equipped with ultra-sophisticated Garmin G1000s, will be a prime player in a $715,000 National Aeronautics and Space Administration (NASA) grant.

The purpose of the government's grant is simple, says Craig: "to put primary, beginner students in the highest technology possible and teach them to fly." From that exercise, NASA wants to determine what time-tested techniques remain relevant today, and which ones have been rendered irrelevant by virtue of new technology.

"I always thought it would be fascinating to put the newest technology in the hands of beginners," says Craig, "especially if this is going to be the norm in 10 or 15 years."

At the heart of the curriculum will be mastery of the Garmin G1000. Consider its capabilities. Among other things, Craig says it employs a three-dimensional earth terrain moving map.

Say there's a 6,000-foot mountain peak 20 miles to the starboard of the aircraft, and the airplane is at 4,000 feet. Looking at the screen on which the image is projected, you'd be looking up at the mountain, much as you would if you were employing Enhanced Ground Proximity Warning technology in an airliner.

The device also has the ability to overlay weather radar along route of flight, has integrated collision avoidance capabilities, and can even monitor critical aircraft functions.

Instrument scan has always been a challenge, especially engine instruments. "Most people don't look at the oil pressure gauge as frequently as they do, say, the altimeter," says Craig. A slow scroll of an indicator into the red zone might not be apparent until it's too late.

"In this system, if anything goes into the caution range, the computer brings that indication up on the screen," says MTSU's Aerospace chief, "followed by procedures on how to mitigate the problem."

It's all part of the package.

That package "allows the pilot to monitor the systems and become more of an information manager," he says. "There are no round dials in the system." At least not that students can see at first glance. FAA, of course, insists all aircraft be fitted with key analog backups. It's just that these will be covered up for training purposes, "because we want to see if these students can learn from the ground up on this technology."

Craig is cognizant of the complexity of the project—and its potential controversy.

"We're all worried about guys like me who have been flying with the old stuff for a long time," he says. "How am I going to move up to the new technology?" Now the operant question is: "How will people who learn in

the new technology come back to the old stuff? Can they do it?"

Students involved in the NASA grant are going to encounter nothing but glass from the time they step into the cockpit until the time they're issued their instrument rating. Nothing. The day after they've received that rating, Professor Craig intends to confront them with a test. "I'm going to take them out to a Cessna 152 and say, 'Fly me to Chattanooga.'"

The 152, of course, will be the most analog of airplanes, bereft of most of the magic the students have grown to depend on.

Those pilots will be completely licensed to fly the 152. Their certificate will simply read, "Private Pilot, Single-Engine, Land."

"They will have an FAA certificate making it legal for them to fly that plane," says Craig. "But I'm going to want to know if they can."

He speculates that as advanced avionics continue to penetrate the GA arena that FAA may have to devise special license endorsements for conventional analog, round dial aircraft—just as there are already endorsements for tail-wheel and special performance airplanes.

The Regulatory Environment

A lot of people are going to follow what unfolds in the skies above middle Tennessee very closely, not the least of which is the FAA.

Some believe it's already time for the government to take a look at the minimum number of hours required to obtain a private pilot ticket.

"For as long as I can remember," says Charlie Priester, a flight examiner, "it's been a minimum of a 40-hour course—divided into dual, solo, cross-country and so forth."

Problem is, as the flight environment has become more complex, the time actually spent turning out a proficient pilot has ballooned to 55, 60, or even 65 hours. "There's just a whole lot more to do to satisfactorily complete the training for a private pilot's certificate," says Priester. "But the regulation, in terms of minimum time, never changed."

A sign of the times. A general aviation airplane with some of the old and some of the new equipment.

It will be instructive to see if what materializes out of Murfreesboro alters that equation, whether—because of simplifying navigation—advanced avionics reinforce the 40 hour standard or raise it.

The Training Dilemna

Priester contends another thing FAA and the industry are going to have to consider, as new avionics are integrated into the general aviation arena, is lack of commonalty.

Air carriers have only a couple of choices when it comes to advanced avionics suppliers. General aviation players have considerably more. "How do we train for that?" he asks. "The manufacturer doesn't do the training. And it's extremely difficult for the flight schools to stay updated on all the various equipment that the aircraft owner or student can put on his airplane."

Simply put, Priester contends, "We have not established an environment to train properly with this equipment. There's no commonalty at all. In many instances, to do a function on one piece of equipment is the exact opposite of how you may do it on another piece of equipment."

That's why he advocates a two-step training procedure: basic airmanship first, then particularized training on how to operate equipment—including new avionics—within the parameters of the system.

It's an approach with which Leslie Erb agrees. Sound, solid—with room for growth.

An old salt, Erb is savvy enough to recognize that we operate in a market-driven world. "People want that new stuff in there," he says. "They'll pay more money for it, and we operators have got to pay for those airplanes some way. So we buy the airplanes they want."

But that, he insists, can't be the end of the story. "We have a moral obligation for the safety of the industry," he says. An obligation to make sure all that those new flying machines, with all their "magic," aren't rendered instruments of skill-destroying black magic.

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Our thanks to the National Air Transportation Association's (NATA) Flight Committee and to Jerome Greer Chandler, a contributing editor to the NATA Aviation Business Journal, where this article originally appeared and is reprinted with NATA's permission.

Challenges in Aviation Education

by Charles L. Robertson

The challenges in general aviation will become critical, if the forecasted growth in the expected use as a means of transporting the public occurs. Research like FITS (FAA/Industry Training Standards) to improve training effectiveness and efficiency must be continued. The FAA should be applauded for its courage and efforts in leading this and other initiatives despite the opposition to change mounted by groups concerned about other issues. These efforts clearly demonstrate the FAA's commitment and ability to make changes where changes are needed. Additional research is needed to solve issues beyond the current projects; however, finding solutions is not the end of the path to improvements. Guidance reflecting how these solutions are to be used and implemented is also needed. Everyone needs to be a part of the solution; that is, everyone needs to apply their talents and abilities to expanding the development and implementation of the new solutions. One of the areas needing attention now is aeronautical decisionmaking or ADM. Research shows there are better ways to teach ADM than those that are currently be employed.

In aviation education, instruction in judgment training is called aeronautical decisionmaking[1], while it is referred to as teaching higher-order thinking skills(HOTS) elsewhere. Teaching HOTS in aviation and non-aviation settings should be the same; however, the current guidance in aviation omits references to teaching cognitive skills. According to Advisory Circular 60-22 and *Aviation Instructor's Handbook* (AIH), "ADM is a systematic approach to the mental process used by aircraft pilots to consistently determine the best course of action in response to a given set of circumstances." Conversely, HOTS are both the cognitive process and skills for deciding what to do[2, 3]. They are the same phenomenon with the exception of the omitted emphasis in cognitive skills.

According to Cotton[4], higher-order thinking includes creative thinking, critical thinking, and decisionmaking. Thomas and Albee[5] asserted that "critical/creative/ constructive thinking is closely related to higher-order thinking: they are actually inseparable." Higher-order thinking skills, including analysis, synthesis, and evaluation, describe the thinking skills used in judgment, decisionmaking, and critical thinking. According to Reigeluth and Moore[6], higher-order thinking skills "are all taught through basically similar methods." The result of this absence of instructional guidance on cognitive skills in ADM is they are not being taught as effectively as they need to be to reduce the number of human factors related accidents.

Traditionally, the literature in aviation reflects this omission and any reference to teaching the development and transfer of cognitive skills[7,8,9]. However, a number of authors have begun to present and discuss the value of teaching cognitive skills in addition to the cognitive process currently addressed in ADM training[8,10,11,12,13,14]. Such reports raise an important concern about why the current guidance and training materials do not reflect the need to teach cognitive skills. While it could be argued that higher-order thinking is far more complex than simply determining where to land the airplane, the underlying skills (analysis, synthesis, and evaluation) needed in making decisions are the same regardless of the complexity of the problem and independent of the setting. The issue in aviation is whether or not pilot judgments can be improved by enhancing both the cognitive process and skills. It is reasonable to assume that the strategies and methods used to teach these cognitive skills elsewhere would be effective in aviation; thus, teaching these skills would improve the pilot's ability to make good judgments and lower the accident rate.

The requirement for effectively teaching HOTS can be identified by examining the current teaching methods and strategies used in disciplines outside of aviation. The research supports instruction in many specific skills and techniques using various instructional approaches to promote the development and enhancement of thinking skills. To foster the development of thinking skills[15, 16], the instruction should include redirection/probing/ reinforcement, asking higher-order questions, lengthening wait-time[4]. These strategies involve engaging the learner in some form of mental activity, examining that mental activity, and then challenging the learner to explore other ways to accomplish the task or the problem[17].

In contrast to the strategies recommended by Landa, the AIH said "the best way to illustrate this [poor judgment chain] concept is to discuss specific situations which lead to aircraft accidents or incidents...a scenario which can be presented to students to illustrate the poor judgment chain." "By discussing the events that led to this incident, instructors can help students understand how a series of judgmental errors contributed to the final outcome of this flight." This difference between the strategies offered by Landa and the AIH is that

Landa's approach actively engages the learner in mental activities, examination, and evaluation, while the AIH directs the instructor to illustrate the poor judgment chain so the pilot can passively understand. According to AIH, "ADM training focuses on the decisionmaking process and the factors that affect a pilot's ability to make effective choices." Nevertheless, it could be argued that the scenarios presented by the instructor would provide the pilot with an example of how to solve a problem and this example could be recalled later to decide what he or she should do to break a similar poor judgment chain. However, it does not teach the pilot how to handle unfamiliar or new error chains.

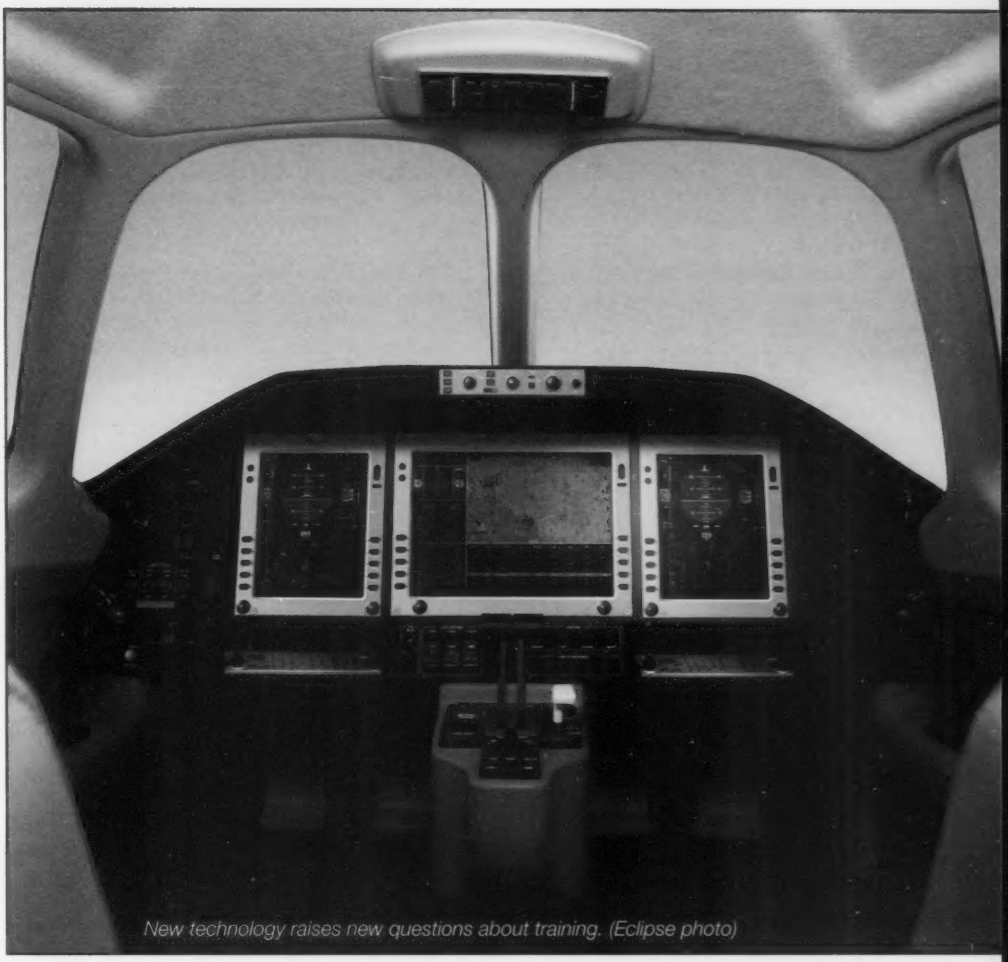
This is the critical difference between teaching judgment in aviation and elsewhere. In aviation many scenarios are presented to the student pilot as worked examples, demonstrating how the expert would solve a problem or a series of problems. The difference would occur when the instruction would also include instruction and practice in applying these techniques to new situations. In other words, teaching the learner to transfer the knowledge from one problem to other problems. Transferring problem solving skills for one problem to another assumes the supporting cognitive skills (analysis, synthesis, and evaluation skills) have been or are being developed as well. The absence of guidance in aviation means this assumption should not be made in the current ADM training.

Teaching higher-order thinking skills effectively involves customizing the examination and exploration of the mental activity to meet the individual learning needs. Kerka[18] said:

"Learning is characterized as an active process in which the learner constructs knowledge as a result of interaction with the physical and social environment. Learning is moving from basic skills and pure facts to linking new information with prior knowledge; from relying on a single authority to recognizing multiple sources of knowledge; from novice-like to expert-like problem solving."[Thomas[19]]

Howe and Warren[3] added, "there needs to be a shift in many classes, from a teacher-centered classroom to a student-centered classroom in which students can be involved in collecting and analyzing information, paired problem solving, cooperative learning settings, simulations, debates, and critical reporting sessions." In addition to the approaches offered above, Landa[17] said, three strategies can be used to facilitate the learning of thinking skills; they are guided discovery, expository teaching, and a combination strategy. Teaching HOTS effectively involves emphasizing HOTS strategies in problem-based learning (PBL), which includes problem solving-, case study-, and scenario-based instruction [Reigeluth[20]]. Cotton[4] said, "educators are now generally agreed that it is in fact possible to increase students' creative and critical thinking capacities through instruction and practice." Ristow[21] and Presseisen[22] reiterate, students can learn HOTS, if schools will concentrate on teaching them how to do so.

Modern learning theories are providing new teaching methods which facilitate learning judgment, critical thinking, and decisionmaking. The



New technology raises new questions about training. (Eclipse photo)

current practices need to be modified to take advantage of the lessons learned in other disciplines. Scenario-based training (SBT) is an example of the family of problem-base learning methods which can be used to facilitate the enhancement of learning, development and transfer of thinking skills, and to prepare the pilots to safely and effectively use the new, as well as the old, technologies being provided to them. The current use of SBT needs to be expanded to include a systematic approach to the development of judgment skills from simple to complex and from concrete to abstract and for the subsequent transference to solving new problems in new situations. All possible situations and problems requiring decisions cannot be taught and trained to proficiency. The development of the ability to solve ill-defined, ill-structured, complex problems must be taught and practiced. Crew resource management (CRM) training is evidence that changes in ADM is needed; however, these changes need to be implemented throughout not just at the end of pilot training. Other disciplines have already developed the teaching methods used to accomplish this. These methods can be adopted by the aviation community to improve aviation safety by reducing human factors related accidents.

The impact of these improvements in training will not be limited to general aviation. Beginning or primary flight training is typically conducted in general aviation for the airlines and the corporate operations. Implementation of new teaching methods cannot wait for someone else to develop the required material. The aviation community needs to employ their talents to developing these materials and support for additional research needs to be shared by all stakeholders to truly make a difference in aviation safety.

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GA Safety: How much better can we do?

by Steven B. Wallace

If there is a single word that defines the joy of general aviation flying, it is freedom. Freedom to rent, buy, or build your own airplane, freedom to fly it slow, fly it fast, fly it over mountains and across the water, fly it at night, fly it upside down. All of these cherished freedoms carry inherent risks. Mostly these risks are skillfully managed, but they are still persistently reflected in the accident statistics.

Is the current number of GA accidents a problem, or just the price of freedom to fly? Put another way—is there such a thing as an acceptable number of GA fatal accidents?

I never get to this question. For me the imperative to do better simply follows from the fact that we can do better, and this does not mean sacrificing our freedom to fly. Doing better preserves our freedom to fly.

The FAA Flight Plan Safety Goal

The FAA Strategic Flight Plan begins with our commitment to do better. The first goal is simply stated: **To achieve the lowest possible accident rate and constantly improve safety.** Eight specific objectives are detailed under this goal. The first objective is to reduce the commercial airline fatal accident rate; the second is to reduce the number of fatal accidents in general aviation.

The GA objective comes with a specific performance target: **By Fiscal Year (FY) 2008, reduce the number of general aviation and nonscheduled Part 135 fatal accidents to no more than 325** (from 385, which represents the average number of fatal accidents for the baseline period of 1996-1998.) Chart 1 shows this graphically. Note that we track all goals on a federal fiscal year basis, so FY 2004 goes from October 1, 2003, to September 30, 2004.

In Chart 1, the red line shows the total number of GA fatal accidents for every year since 1989.

The green line shows our Safer Skies safety improvement target, shown as a not-to-exceed number of accidents, declining each year.

The blue line shows the number of accidents through the month of May for every year since 1989, which provides a basis to compare how we are doing so far this year.

This performance target is further broken down into annual improvement targets, and the not-to-exceed total for FY 2004 is 349. The red line on

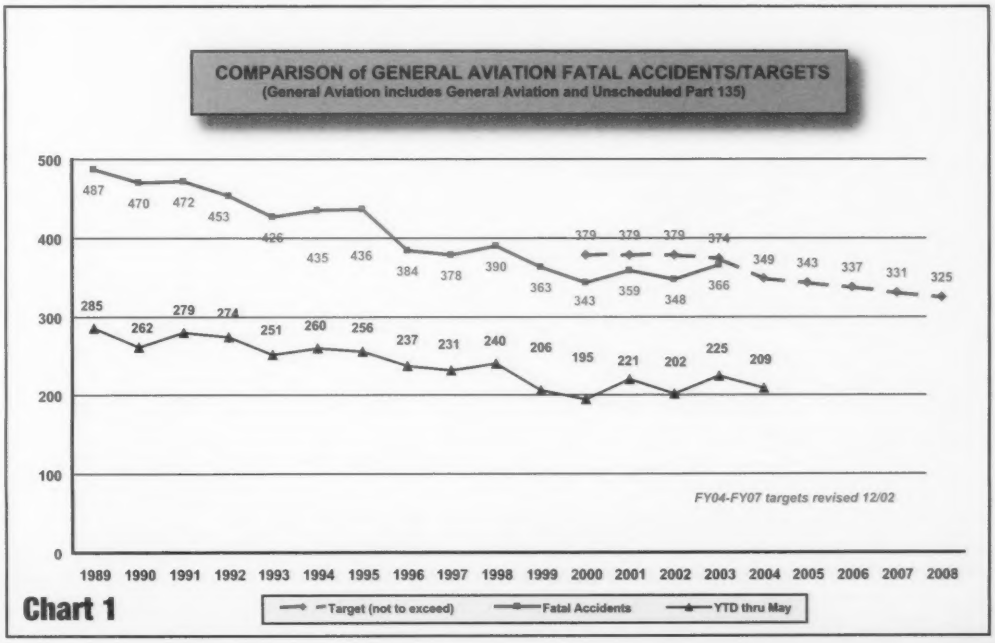


Chart 1

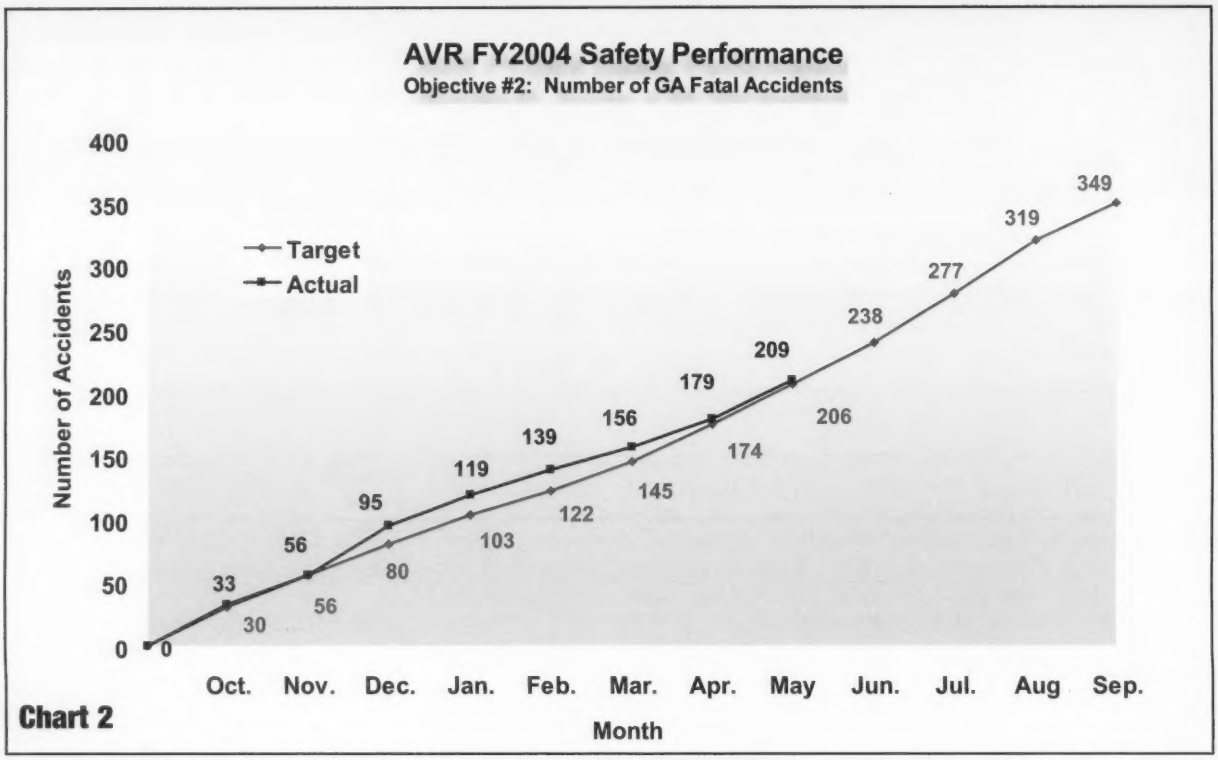


Chart 2

Chart 2 is designed to show if we are on track with the total at the end of each month and is slightly adjusted for seasonal changes in activity levels. The black line shows the actual total at the end of each month. So, how are we doing for FY 2004? After a bad December, we have been progressing back toward our target, but it is going to be a tough goal to meet.

Is aviation safety all about numbers? No, it is about saving lives. We just find that it helps accountability all around to try to measure results and keep our eye on them constantly, so that is what we do. These numbers, along with other safety targets, are continuously reviewed up to the highest levels in the FAA.

What is the General Aviation Joint Steering Committee (GA JSC)?

The General Aviation Joint Steering Committee (GA JSC) was formed in 1998 to lead the GA accident reduction effort under the FAA Safer Skies Focused Safety Agenda, in parallel with the Commercial Aviation Safety Team (CAST), which focuses on commercial aviation safety. The GA JSC completed analytical work and issued recommendations that resulted in numerous interventions and initiatives in areas including weather, controlled flight into terrain (CFIT), aeronautical decisionmaking, and runway safety.

Participants have included Aircraft Owners and Pilot Association (AOPA), General Aviation Manufacturers Association (GAMA), Small Aircraft Manufacturers Association (SAMA), National Business Aircraft Association (NBAA), Helicopter Association International (HAI), Experimental Aircraft Association (EAA), and National Air Transportation Association (NATA). Numerous FAA offices are involved, as well as the National Transportation Safety Board (NTSB) and the National Weather Service.

With the retirement in 2003 of the government and industry co-chairs of the GA JSC, Mike Gallagher from the FAA and Jack Olcott from NBAA, new co-chairs were named, myself for the FAA, and Bruce Landsberg, Executive Director of the AOPA Air Safety Foundation.

While recognizing the excellent work done by the original GA JSC, we have agreed on a few shifts in our approach, including:

- Reviewing and seeing though any further interventions in the areas of weather, CFIT, and aeronautical decisionmaking from the original JSC efforts

- Analyzing recent accidents to identify emerging trends, such as those associated with a shift in use of GA aircraft more for transportation and less for simple pleasure flying, and the increasing prevalence of technically advanced aircraft. The charts on the following page include a causal and geographic analysis of the seven months of GA fatal accidents through May, 2004.

- Identifying specific new interventions addressing major accident cause areas, including seasonal issues. These interventions

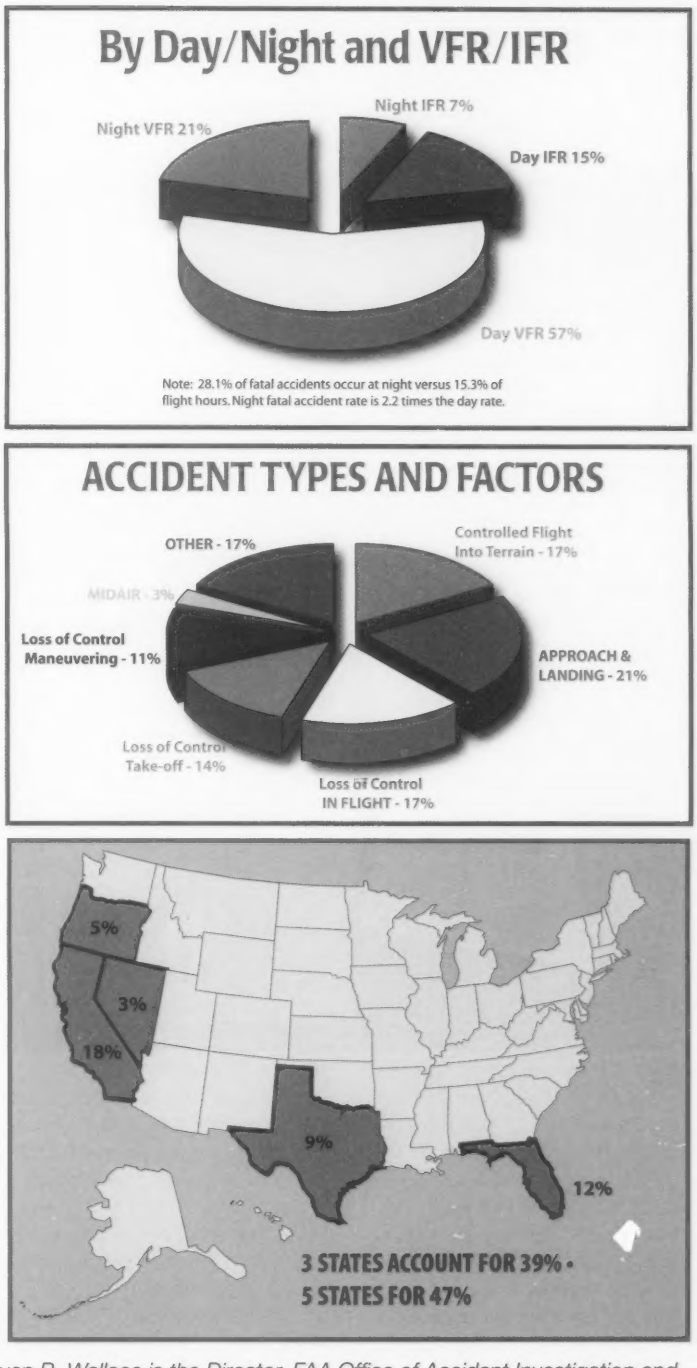
range from issuance of formal guidance material, such as FAA advisory circulars to publication of instructional articles in magazines and more and more utilization of web-based materials and interactive training aids.

- Short of not promoting specific commercial products, the GA JSC draws no distinction between what is done by the government and what is done in the private sector. This effort is shared across the aviation community, and the GA JSC does not direct it, but works to achieve a government/industry consensus on effective new strategies and interventions.

- Almost all of our interventions have been non-regulatory, and we expect this to continue.

- We have as an objective an eventual shift to measuring the general aviation accident rate, most likely measured against flight hours, as opposed to counting the raw number of accidents and fatal accidents. This has been difficult without the kind of accurate activity level measures which are available in the commercial sector, but the FAA has recently agreed on a means to fund the current GA Activity Survey, which is contracted by the FAA; and we are developing an agreed approach to a consistent funding source, so that users can be assured of having the best possible data on GA activities. This survey provides the "denominator" for accurate safety measures, which are vital to measuring the need for and effectiveness of various interventions.

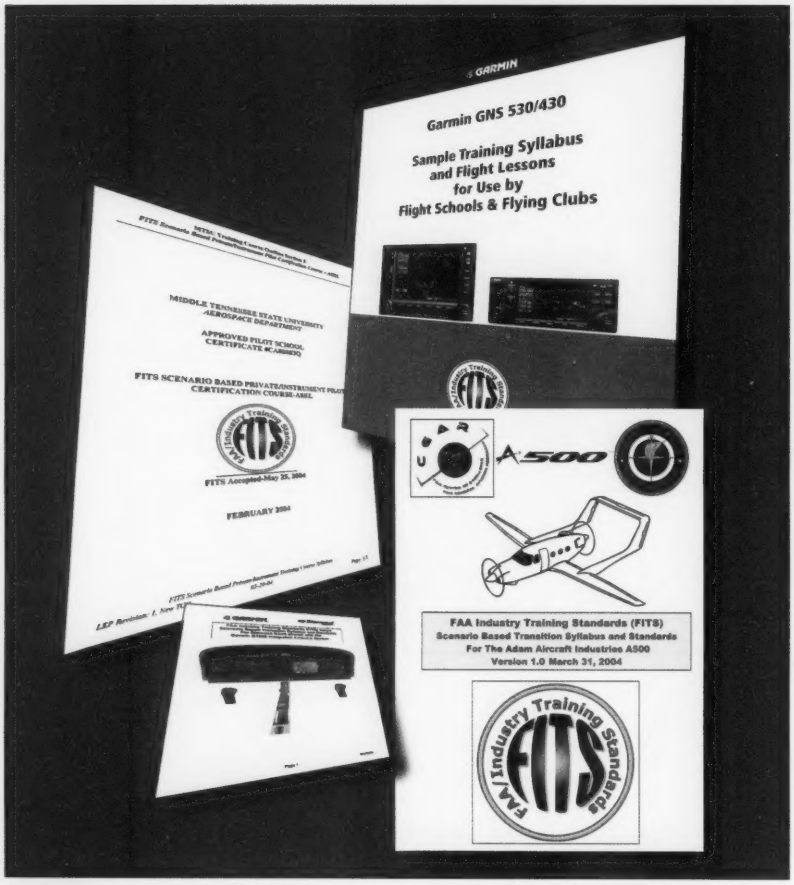
The GA JSC meets collectively only about three times per year, but the work to improve GA safety of our members and the broader GA community goes on every day. Be a part of this effort. We can do better.


GA Fatal Accidents Analyzed
October 2003 - May 2004
By Day/Night and VFR/IFR
Night IFR 7%
Night VFR 21%
Day IFR 15%
Day VFR 57%
Note: 28.1% of fatal accidents occur at night versus 15.3% of flight hours. Night fatal accident rate is 2.2 times the day rate.
ACCIDENT TYPES AND FACTORS
OTHER - 17%
Controlled Flight Into Terrain - 17%
MIDAIR - 3%
Loss of Control Maneuvering - 11%
APPROACH & LANDING - 21%
Loss of Control Take-off - 14%
Loss of Control IN FLIGHT - 17%
5%
3%
18%
9%
12%
3 STATES ACCOUNT FOR 39% •
5 STATES FOR 47%

Steven B. Wallace is the Director, FAA Office of Accident Investigation and Co-chair of the General Aviation Joint Steering Committee (GA JSC). He holds a Commercial Pilots Certificate with Multiengine, Instrument, Seaplane and Glider ratings

Safety Progress through FAA/Industry Partnership:
The Role of the FITS Oversight Committee

by Paul Fiduccia



The general aviation (GA) industry associations and the FAA's General Aviation and Commercial Division (AFS-800) have a long history of working together to improve aviation safety. The most recent major safety enhancement program was the Safer Skies Focused Safety Agenda, the goal of which was to reduce fatal accidents by 80% in 10 years. Beginning in 1998, Joint FAA/Industry Safety Analysis Teams (JSATs) analyzed accidents to determine their root causes and what should be done to address these causes. The Joint Safety Implementation Teams (JSITs) then developed specific action plans, with deliverables and dates, for government and industry to accomplish the recommendations of the JSATs. Representing Small Aircraft Manufacturers Association (SAMA), I was the industry chair of the GA Weather JSAT and JSIT.

The GA Weather JSIT report contained several projects to reduce GA fatal weather accidents with specific actions identified for FAA, the National Weather Service, and industry groups. One of these projects was to improve the elements of the training system that related to weather decisionmaking. A subsequent JSAT on aeronautical decisionmaking (ADM) created another set of recommendations for training system improvements, most of which addressed weather decisionmaking skills.

In 2003, SAMA and AFS-800 co-chaired the Technically Advanced Aircraft (TAA) Safety Study, which analyzed accidents involving aircraft with advanced avionics: GPS navigators, moving maps, and autopilots. TAA's are rapidly becoming the majority of the GA fleet through retrofit panel upgrades and new production of "glass cockpit" GA aircraft. The TAA Safety Study employed the same processes as the Weather and ADM JSATs to examine fatal GA accidents in TAAs, identify root causes, and make recommendations for interventions. The TAA Safety Study report contained additional training recommendations specific to TAA operations and addressed to pilots, aircraft owners, aircraft and avionics manufacturers, instructors, examiners, insurers, and other entities which can affect GA safety—comprising a "system safety approach" to accident reduction.

Many of the Safer Skies and TAA Study training recommendations involve actions by AFS-800, which embraced these recommendations and began to implement them. These actions include:

1. AFS-800 decided to address the recommendations, wherever possible, through the creation of FAA/Industry Training Standards (FITS), rather than through rulemaking or advisory circular publication. The FITS program would enable more in-

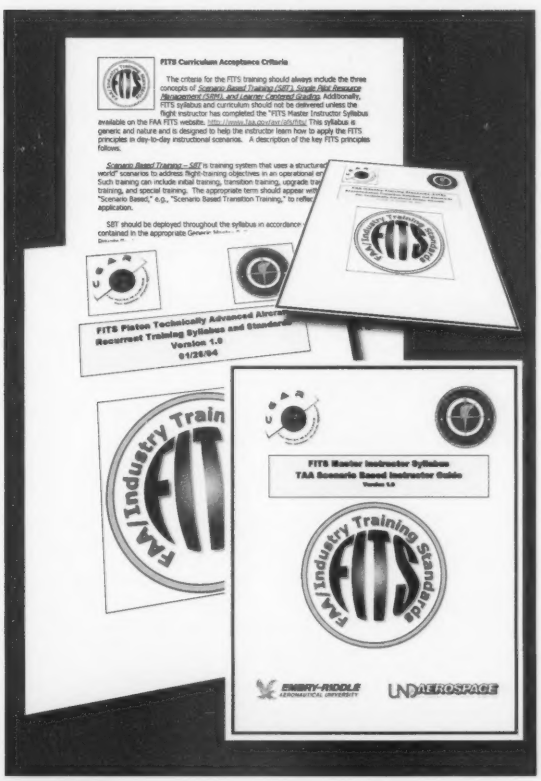
dustry participation and faster production of training documents.

2. FAA requested additional resources from Congress to address the recommendations that required research into state-of-the-art training methods. With industry assistance, FAA secured funding for the Center for General Aviation Research (CGAR), consisting of Embry-Riddle Aeronautical University, the University of Alaska, and the University of North Dakota. CGAR developed model-training syllabi for piston-engine TAA transition, recurrent, and instructor training in 2003. It is currently developing a combined private-instrument curriculum, and next year will complete work on very light jet transition, recurrent, and instructor training materials.

3. GA industry groups and AFS-800 jointly produced the *Personal and Weather Risk Assessment Guide*, to assist pilots in establishing personal minimums and in managing weather risks. (This guide and the piston TAA training documents are available on the FAA FITS Program web site at <www.faa.gov/avr/afs/fits>.)

4. To assist FAA in making these training improvements, the industry formed a FITS Oversight Committee (FOC), which I have the honor of chairing.

The FOC was formed in late 2002 to review the plans and progress of the CGAR activities and to determine how industry action could supplement this FAA program. The initial members of the FOC included the "usual suspects" in FAA/Industry safety initiatives: the Aircraft Owners and Pilots Association (AOPA), the AOPA Air Safety Foundation, the Aircraft Electronics Association (AEA), the General Aviation Manufacturers Association (GAMA), the National Air Transportation Association (NATA), and the National Business Aviation Association (NBAA).



The FOC first met in February 2003 to review and comment on the initial FITS CGAR mission statement, goals, tasking, and schedule. This meeting developed the pattern for FOC activities. The FOC works with the CGAR organizations and FAA FITS program managers to identify how FITS program and corresponding industry efforts could maximize the safety benefits of the training elements of the Safer Skies and TAA Safety Study recommendations. In some cases, FOC provides input to the CGAR research organizations on the needs of small flight schools or on planned industry efforts regarding new aircraft or avionics or new training systems. The focus of the FOC is to provide a partnership on the implementation of the training recommendations previously made by joint FAA/Industry safety efforts.

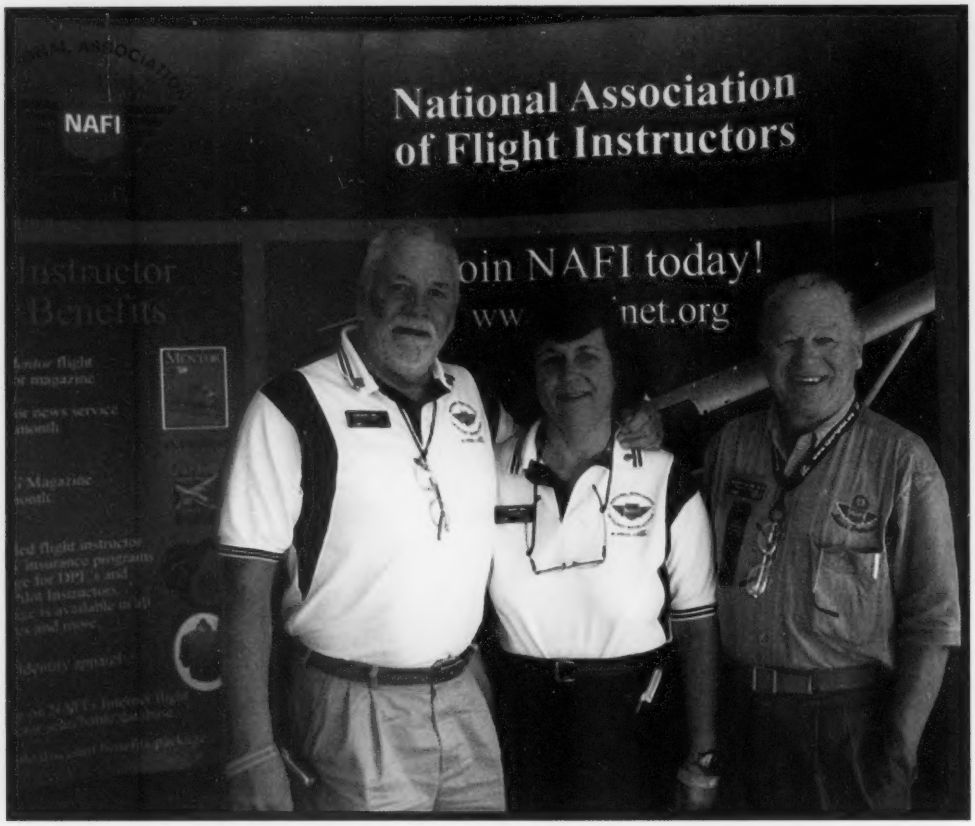
As the scope of the discussions enlarged to broader joint-implementation activities, the FOC expanded its membership to include:

- Aircraft companies such as Adam, Cessna, Cirrus, and Eclipse Aviation.
- Training organizations such as Electronic Flight Solutions, Frasca, Jeppesen, King Schools, and the National Association of Flight Instructors.
- Insurers such as AVEMCO, Global Aerospace, Universal Underwriters, and USAIG.

Additional FAA offices also participated, such as the GA research division at the FAA's Technical Center, and Regulatory Support Division (AFS-600) that manages practical test standards and other training documents, as well as the director of the FAA's Flight Standards Service. Both AOPA and Experimental Aircraft Association (EAA) have sponsored FOC meetings at their conventions. The FOC will soon review the draft Combined Private/Instrument curriculum, and conclude its work with a review of the very light jet training documents next year.

As discussed in the previous article, the FAA and industry have also seen a turnover in the leadership of the General Aviation Joint Steering Committee. With a renewed commitment to continue the excellent work this group has done under the Safer Skies Agenda, the new leadership will continue the effort to understand emerging new causes of GA accidents associated with changes in aircraft, avionics, GA pilots, and operations.

Paul Fiduccia is the FOC Chairman and the President of the Small Aircraft Manufacturers Association.



Master Instructor Program Administrator Sandy Hill(L), his partner JoAnn Hill, and NAFI Executive Director Rusty Sachs

Gung Ho! Enhancing Safety by Working Together

by Rusty Sachs

Aviation safety is too important to leave to the FAA alone.

There. I said it, right out in front of the Administrator and everybody, and in an FAA publication, too! Of course, the FAA offers the Aviation Safety Program, which sponsors aviation safety seminars, the Pilot Proficiency (WINGS) Program, and the Aviation Maintenance Program. But aviation safety is too important to leave to the FAA alone.

But once we agree on that point, where do we go? Fortunately, some folks have been asking that question—and coming up with inventive answers—for the better part of a decade, and their focus is paying dividends at one of the most exciting and challenging times in the history of powered flight. There are three programs that come to mind that actively promote safety through the help of volunteers, who are willing to share their expertise and time.

Master Instructor Program

The Marine Raider Battalions of World War II took their motto *Gung Ho!* from the Chinese expression meaning *work together*, so there's a fitting symmetry in the fact that one of the individuals setting the example of ground-breaking cooperation between the FAA and private industry is Marine veteran Sandy Hill of Longmont, Colorado. Working tirelessly alongside his wife, JoAnn, and the National Association of Flight Instructors (NAFI), Sandy has administered the innovative Master Instructor Program since its inception in 1997. Together with the FAA's General Aviation and Commercial Division (AFS-800), NAFI has created a valuable tool to recognize excellence and inspire concrete steps to keep the skies safer.

The Master Instructor Program sits on the fundamental premise that flight instruction is a dynamic profession, requiring constant effort to met the needs of the changing aviation environment. It applies to flight instruction principles similar to those required for the continuing education of lawyers, doctors, dentists, and accountants. In those professions, licensing requires each individual to undertake some minimum amount of

continuing training each year. As Ron Fox, an attorney friend, once remarked "If I didn't participate in continuing education every few months, I'd soon end up as an expert on what the law used to be!"

NAFI awards the Master Instructor designation for a two-year period, only after extensive scrutiny of the applicant's credentials. Each person aspiring to the designation must demonstrate at least 32 Continuing Education Units (CEUs) during the preceding two-year interval, spanning four categories: Educator, Service, Media, and Participation. At least 16 CEUs must fall in the Educator category, with the remainder distributed among the remaining categories; and here comes another instance of cooperation crucial to excellence.

While Educator CEUs can be earned in a variety of ways familiar to most aviation teachers—WINGS program seminars, in-flight training, and teaching aviation-related courses at high school and college level are a few obvious examples—other categories require the CFI to work together with other organizations or groups. The applicant generally does Service category work pro bono with Civil Air Patrol, scouts, or an established association such as Angel Flight or Make-a-Wish, but mentoring young instructors also qualifies. CEUs in the Media category require writing and publishing original works—as simple as a letter to the editor of the local newspaper concerning an issue of local importance or as complex as an entire book (Greg Brown, author of *The Savvy Flight Instructor*, was the first individual to earn the Master Instructor title, and he received credit for that classic work). Sounds like a lot of work, but the instructors who participate are really improving their own skill so they are prepared to teach the next generation of pilots.

How can we measure the effectiveness of this program? Robert Wright, manager of AFS-800, found its value of such obvious magnitude that receipt of the Master Instructor designation automatically qualifies an instructor for renewal of the Flight Instructor Certificate. "It was a no-brainer to make that decision," he explained, adding "and it wasn't necessary to initiate any regulatory alterations!"

Walt Schamel is the 2004 Aviation Safety Counselor of the Year and is also a NAFI Master Instructor. An article about Schamel and the other General Aviation Industry Awards Program winners will appear in the September/October issue of FAA Aviation News.

Aviation Safety Counselors

It is no coincidence that more than half of all Master Instructors also participate in one of the senior examples of cooperation between the FAA and the private sector. More than 30 years old, the Aviation Safety Program has had several reinventions with a new one in the works. But one thing has been constant, the support of volunteers, better known as Aviation Safety Counselors (ASC), to help promote safety. Again the name has changed over the years, but the purpose has remained the same. They voluntarily serve as assistants to the FAA Safety Program Managers (SPM) in performing safety functions in their community.

Safety Program Managers select individuals as ASCs to act as advisors to the aviation community in support of aviation safety, but without designated regulatory authority. Counselors are selected for their interest in avia-

tion safety, their professional knowledge, and their personal reputation in the aviation community. Some ASCs have operational expertise while others focus on airworthiness issues, but all enjoy the authority to conduct safety seminars, which airmen may attend as part of the Pilot Proficiency (WINGS) program. They also may counsel airmen on issues of safety, although they have no authority to enforce regulations or instigate actions against an airman's certificate. Many airmen are relieved to learn that the person taking them to task for a runway incursion or improper radio transmission is a volunteer with power to do no more than counsel him! The use of private individuals, who boast a wide variety of skills and talents, affords the general aviation community access to countless opportunities to learn and at no cost to the taxpayer! To find out more about being an ASC, you can visit the following web site at <www.faa.gov/avr/afs/safety/asc.cfm>.

Another General Aviation Industry Awards winner, who is also a NAFI Master Instructor, is Doug Stewart, the 2004 Certificated Flight Instructor of the Year.

General Aviation Industry Awards Program

It seems trite to say that the best way to inspire safe practices in others is to extol the virtues of those demonstrating and preaching safe practices themselves. Yet that simple act lies at the core of the General Aviation Industry Awards Program, sponsored each year by in a cooperative effort of the FAA and a consortium of private aviation groups. Each year, that program conducts a rigorous screening of nominees from around the nation to select a Certificated Flight Instructor of the Year, an Aviation Maintenance Technician of the Year, an Avionics Technician of the Year, and an Aviation Safety Counselor of the Year. "The GA Awards program highlights the vital role played by individuals in promoting aviation safety and education," said JoAnn Hill, Chair of the Awards Committee. "The program's sponsors are pleased that these outstanding aviation professionals receive the recognition they so richly deserve." The FAA Administrator, or her representative, presents the awards each summer at EAA AirVenture™ in Oshkosh, Wisconsin, the nation's *de facto* headquarters for general aviation.

Organizations cooperating with the FAA to provide support and sponsorship for the awards program include the Experimental Aircraft Association (EAA), the General Aviation Manufacturers Association (GAMA), the National Air Transportation Association (NATA), the Aircraft Owners and Pilots Association (AOPA), and the National Business Aviation Association (NBAA) along with the Aircraft Electronics Association (AEA), the Aeronautical Repair Station Association (ARSA), the Helicopter Association International (HAI), the National Association of Flight Instructors (NAFI), the National Association of State Aviation Officials (NASAO), the Professional Aviation Maintenance Association (PAMA) and Women in Aviation International (WAI). Those interested in learning more about the awards or for a nomination form, visit the following web site, <www.faa.gov/avr/afs/safety/INDUSTRY.cfm>.

Summary

The three programs discussed represent only the tip of the iceberg needed in the United States today, as general aviation faces the demands of increasingly sophisticated aircraft—flat panels, complex avionics, and glass cockpits—at the same time that the Sport Pilot and Light-Sport Aircraft regulation is about to become a reality, bringing with it the specter of 150,000 new airmen to be educated, inspired, and monitored. Only by working hand-in-glove with knowledgeable, dedicated aviation professionals can the FAA hope to fulfill its mission. As the firmament becomes more crowded, air safety becomes of concern to everyone; and it's too important to be left to the FAA alone.

Rusty Sachs is the Executive Director of the National Association of Flight Instructors.

It's Time To Change Our Lying Ways

by John and Martha King

Ever since the days of the barnstormers we've been lying to our passengers, and worse yet, to ourselves. The barnstormers would tell passengers, "It's perfectly safe." And we've been telling passengers that ever since. We now even go so far as to tell the big lie, "The most dangerous part of the trip is the drive to the airport." The sad part about this is that most pilots actually believe this.

This statement is true as far as the airlines go. On a per mile basis the airlines work out to be about seven times safer than driving. But general aviation airplanes aren't in the same league. On a per miles basis you are 49 times more likely to be involved in a fatality in a general aviation airplane than in an airliner.

The reason the big lie is sad is that when pilots fail to admit the risks, the odds are they won't do a good job of managing those risks. Plus, lying to passengers only serves to undermine our credibility. To them the risk is intuitive. We load ourselves into this noisy metal container that shakes and rattles. We hurl ourselves down the runway at a lethal speed just to get airborne, and then fling the whole assemblage into the air. After this you ask the passengers to trust the guy who told them, "This is perfectly safe." It would be much more comforting if we told them, "Just as with any other activity, there are risks associated with flying. What we are taught when we learn to fly is how to manage those risks."

One of the reasons our general aviation fatality rate is so high is that the flight training we all received is flawed. The vast majority of fatal accidents are caused by a failure in risk management, yet flight training is focused almost exclusively on skill.

Actually what little risk management that is taught is done by passing along clever sayings, making up rules, and telling stories. We say such clever things as, "The two most useless things are the runway behind you and the altitude above you," and "The only time you can have too much fuel is when the airplane is on fire." These sayings have their place and really can be helpful. It's just that they only deal with specific situations.

The way pilots really learn risk management is by "experience." The way it works is pilots either intentionally or unintentionally expose themselves to a risk. If they don't scare themselves, they place the risk in the acceptable category. In reality, they may have just been lucky. The more times a pilot gets away with taking a risk, the more the pilot feels the risk is acceptable.

If on the other hand, the pilot does scare himself or herself, they add that risk to the long list of things they won't do any more. The more "experienced" a pilot becomes; the longer the list.

The problem with learning by experience is that experience is a hard teacher. She gives the test first, and the lesson comes afterward. Many pilots and their passengers don't survive the test in order to get the lesson.

Clearly this is a flawed procedure. It results in too many dead pilots and their passengers. Plus, even the lucky pilots who survive to get a long list of things they won't do any more, still have no procedure to help with risks that they have not yet experienced or haven't anticipated.

The answer is that instructors must teach, and pilots must learn a practical, proactive procedure to anticipate and manage risks. Practical risk management means that we have to be able to actually use our aircraft. If we wanted to totally eliminate all risks from flying, we could just not fly.

The reason we must be proactive about risk management is that that the risks in flying can often be sneaky and insidious. They catch pilots by surprise. After all, pilots who come to grief by flying into worsening weather didn't deliberately take off and fly in weather they knew would kill them. What happened is that the weather changed while they were in flight and they failed to manage this situation properly.

We already use this kind of proactive procedure when it comes to managing the risks in the mechanical condition of our aircraft. We take what we think is a perfectly working aircraft into the shop for an inspection. We probably flew it to the airport. Then the shop uses a checklist to proactively conduct surveillance on the aircraft looking for things that could present a problem if not dealt with. Finally, the shop takes corrective action to manage the situation.

As pilots we must use a checklist

to conduct the same kind of surveillance for the risks associated with a flight.

We recommend the **PAVE** checklist.

PAVE stands for four categories or risk factors:

Pilot
Aircraft
En**V**ironment
External Pressures

• "Pilot" suggests that you think about the risk factors associated with you the pilot. Think about such things as your currency and familiarity with the aircraft. Also, consider your physical condition. (The IMSAFE checklist can be a help here.)

• "Aircraft" reminds you to consider whether the equipment and performance of the aircraft available to you is suitable for this mission.

• "EnVironment" prompts you to examine the weather, the terrain, and daylight vs. darkness for risks.

• "External Pressures" refers to things that are not actually part of the flight, but linger in the background to pressure you to complete the flight on time or to continue when you shouldn't. They are things like people waiting for you at the airport, a scheduled business meeting with no time pad, or even your own hard-wired tendency to want to complete things that you start. This goal-oriented behavior is usually a good thing in the rest of your life, but can be a risk factor in an airplane.

These "external pressures" are the one risk factor that tends to make you ignore all the others. You manage them by remembering they lurk in the background and taking proactive steps to minimize them before you depart.

The way we recommend you use the checklist is during the preflight to think about each of these risk factor categories and identify the risk factors associated with the upcoming flight in each category. Then take steps to manage those risks. The identification of an unacceptable risk factor or marginal risk factors in more than one category is grounds for canceling the flight.

In the air we recommend you conduct an attention scan similar to the instrument scan an instrument pilot uses. Most pilots use a hub-and-spoke scan with the attitude indicator serving as the hub and then spoking out to and back from the other instruments such as the altimeter, heading indicator, and airspeed indicator.

To conduct the attention scan the pilot uses physical control as the hub. Then the pilot's attention spokes out to the items of the CARE checklist.

The categories of the **CARE** checklist are:

Consequences
Alternatives
Reality
External Pressures.

• "Consequences" reminds you to think about the changes that are always taking place during a flight and considering the consequences of those changes. For instance, a groundspeed different than you anticipated most likely means a change in the winds aloft. If the groundspeed is decreased, it means you will arrive later than planned, more fatigued, under stress from being late, and lower on fuel. Since the winds aloft drive the weather patterns, the odds are that the weather at your destination will be different than you planned on as well.

• "Alternatives" is the reminder to always have alternatives. When you take off you have a very large circle of alternatives that will let you fly the distance to your destination plus reserves in any direction. As your flight continues, your circle of alternatives keeps getting smaller and smaller. When you arrive at your destination, your circle of alternatives has shrunk to the distance your reserve fuel will allow. Plus, you the pilot are now fatigued and less capable of dealing with the demands of decisionmaking. You can always re-expand that circle of alternatives at any time simply by landing to get some rest and re-fuel.

• "Reality" reminds you to deal with things as they really are, not just as you planned them to be. A pilot who continues into worsening weather conditions or with a known defect is often in denial. The answer is to deal with reality and not be in denial.

• Finally, "External pressures" reminds you to be aware of and manage those pressures in the air that tend to make you continue when you really shouldn't.

The lesson is all of this is that we as pilots must admit the risks, conduct surveillance for them and manage them. Only when we become proactive about this will have any hope of being able to say, "The most dangerous part of the trip was the drive to the airport" and have it be true.

John and Martha King are the co-owners of King Schools, Inc., and fly airplanes, helicopters, and airships.

IM SAFE

Illness
Medical Condition/Medication
Stress
Alcohol
Fatigue
Emotion

For a more detailed explanation of the IM SAFE checklist can be found in the January/February 2004 *FAA Aviation News*

Good Customer Service = *Good Business Practice*

"Today, the challenges facing aviation demand nothing less than transforming the system. Securing safe air travel, navigating industry uncertainties, and managing new technologies require that we embrace change as never before. Our *Flight Plan* is how we propose to do this." The FAA has committed to four aggressive goals that will enhance aviation safety and has encompassed them in what is known as the FAA's *Flight Plan*. The opening statement of this article is from the *Flight Plan*'s introduction and seemed appropriate for this next topic. The *Flight Plan*'s four goals are increased safety, greater capacity, international leadership, and organizational excellence. Many of the articles you have already read in this special issue have talked about increased safety, but this article takes a new direction, that of organizational excellence and the FAA's Customer Service Initiative (CSI).

In December of 2002 FAA Administrator Marion C. Blakey made the statement, "...there are concerns that we give different answers in different parts of our organization...an issue of consistency in the way we approach things...FAA's standing in the world...depends on our employees." With this statement the Customer Service Initiative was implemented in all FAA regulation and certification offices. Its ultimate goal is to apply FAA rules and policies in a standard and consistent manner. The Administrator admitted in a later speech that another thing she has "...heard over and over is that we need to be more consistent with our customers. You can get one answer from one FAA office or region and another from another." Of course, there are those who think that this is not necessarily a bad thing. However, the implementation of the Customer Service Initiative promises to change that.

The goals of the CSI are to promote more consistency and fairness in applying FAA regulations, promote earlier resolution of disagreements, provide better documentation of FAA decisions, and make every employee accountable for achieving the service's mission. Each office that comes under the Associate Administrator for Regulation and Certification (AVR) has developed its own customer service initiative, and they are available on the Internet at <www.faa.gov/avr/customerservice>. To ensure compliance, all AVR managers and supervisors were provided written guidance and training on the goals of the CSI. The main goal is to provide more consistent and fair application of the federal aviation regulations. This means that every AVR employee will be accountable in achieving the FAA's mission by giving a service that promotes a safe, secure, and efficient aviation system.

How Does It Work?

When the customer calls the FAA, they can expect considerate, respectful, and professional service. The customers range from certificated operators, airlines, air agencies, and other commercial operators to an individual airman or even the non-aviation public. The topics vary from certification and regulations issues to complaints about aircraft noise and every topic in between. The explanation of the requirement, alternatives, and possible outcomes will be clear and all regulation and certification decisions will be documented for future reference. The goal of the CSI is to promote earlier resolution of disagreements, but if the customer doesn't agree with the answer received, the issue can be taken up to the next level for review. This information will be provided by either the AVR employee or can be obtained by going to the FAA web site <www.faa.gov/aboutfaa/Organizations.cfm> and clicking on the district, regional, or headquarters location that you want.

Please remember that safety is FAA's first priority, so elevating your request may not mean that the original decision will be overturned. To make an informed decision, FAA needs all the facts and information regarding your issue. You expect the FAA to act professionally, we ask for the same courtesy from you, our customer.

CSI Flight Standards

As mentioned earlier, each AVR service has its own customer service initiative, and as part of AVR, Flight Standards has implemented its own initiative, which can be found on the Internet at <www.faa.gov/avr/afs/csi/opguide.cfm>. This publication, *"CSI: Flight Standards,"* is a tool for both Flight Standards employees and our customers to understand what to expect on both sides and how differences may be resolved. Flight Standards' mission is to provide the public with accident-free aircraft operations through the highest standards in the world. In fulfilling that mission, Flight Standards and customers may find themselves on opposing sides of an interpretation of a regulation or a standard.

It cannot be emphasized too many times. Safety will be the basis of any decision Flight Standards makes about an issue of concern to you. There will be occasions when regulations or safety will not allow us to accede to your position on an issue. *"CSI: Flight Standards"* will aid us both in that process so that the ultimate resolution of an issue is mutually agreeable. Be sure to provide all pertinent information in a timely manner. To make an informed decision, we need all the information pertinent to the issue.

Too often differences over operational issues devolve into clashes of personalities—a customer's economic needs on one hand, an inspector's commitment to safety on the other. Both sides of an issue may have merit, but if the issue cannot be discussed professionally, little is gained. Customers want professional courtesy from Flight Standards, and we want it in return from customers. The emphasis is resolution at the lowest possible level but with the opportunity for the customer to elevate a decision through Flight Standards' and, then, the FAA's "chain-of-command."

"CSI: Flight Standards" outlines a process which addresses your issues at the lowest possible level, early on in the evolution of the issue. At this point, your issue could be resolved in as few as 10 business days when you raise the issue at your local office level. Even elevating the issue through the levels of review in this process, you could receive a final resolution in no more than 40 business days. The temptation for a customer with a significant or important issue is to elevate it right away to a Flight Standards regional office, Flight Standards headquarters, or even the FAA Administrator. In the long run, this could extend the decision period because your local office is most familiar with your operation and the issues you may have. In addition, raising the issue at a higher level initially will only result in the issue being "sent back" to the local office. No matter what your relationship in the past with your local office, we suggest that you start first at that level and allow the process described here to unfold.

The use of the CSI is the way FAA and Flight Standards are now doing business. As Jim Ballough, director of Flight Standards, said, "Through this emphasis on professionalism and customer service, my promise is that Flight Standards' customers receive timely service in partnership with our employees, who will maintain the highest levels of integrity, competence, and accountability.

(Cirrus photo)

Myth-makers and copywriters love to write about the "magic" of flight, and many pilots enjoy perpetuating the idea to passengers and friends. After all, flying can truly be a magical experience that fills our hearts, even as it empties our wallets.

There is, however, no mystery or magic involved in safe flight operations. Safe flying is all about harnessing the immense power of solid knowledge, sharp skills, and professional attitudes to assess the hazards and manage the risks associated with manipulating the four forces of flight when you are several hundred (or several thousand) feet above Mother Earth. Knowledge that you left in the book is just as useless in aviation as fuel that you left in the truck. That's why there is so much emphasis right now on finding effective ways to incorporate the right knowledge, skills, and attitudes about risk management and aeronautical decisionmaking into all levels of flight training.

The federal aviation regulations (now known as Title 14 Code of Federal Regulations or 14 CFR) have long required pilots to acquire knowledge by mandating that the pilot in command (PIC) "become familiar with all available information concerning that flight" (14 CFR §91.103). The specific regulation, CFR §91.103, provides examples of what that information "must" include list several important preflight actions (e.g., checking the runway lengths at airports of intended use).

As pilots learn in their very first private pilot ground school course, there are many sources for this kind of technical information. However, "all available information" is a much broader term. There are actually many sources for information and knowledge about all other aspects of the flight, including the vitally important risk management and decisionmaking components of flight planning and flight operations. Some exist only on paper. Many are available online. Some were developed by the FAA. Others were created by industry.

Since it is not possible to benefit from knowledge that you don't even know about, the first challenge for pilots and flight instructors is to find what is available or, in other terms, to know what is "know-able." Because valuable knowledge emanates from so many different sources, pilots and flight instructors currently find information in much the same way as we might use a non-directional beacon (NDB): we find a discrete bit of data and track it to its source. We have no really good way of knowing what other pieces of valuable knowledge, information, and experience might be around.

To help pilots and the flight training community navigate more efficiently to the knowledge needed for any given flight operation, the FAA is working to build the knowledge equivalent of a GPS database for general aviation. As currently envisioned, this database, or "sourcebook," will list FAA and industry safety goals, objectives, and statistics. It will provide a glossary of GA safety programs and explain how they relate to one another. It will include a list of available safety publications, products and tools. It will describe and explain safety standards and guidelines, including changes to the Practical Test Standards (PTS), FAA knowledge tests, and other technical standards and guidelines. The sourcebook database will provide a "who's who" list of general aviation flight training, mentoring, and safety resources for pilots and flight instructors. Finally, it will provide information on events, such as flight instructor refresher clinics (FIRCs), safety seminars, initial/recurrent standardization clinics for pilot examiners, and other such events.

To ensure the widest possible availability, the annual GA sourcebook will be produced in both paper and electronic forms. Pilots would be able to use the electronic form of the sourcebook in much the same way as they use a GPS today: call up a categorized list of tools and topics, highlight the one you want, and navigate "direct to" the knowledge you need to plan and carry out a safe flight.

To ensure that the GA sourcebook database includes the kind of knowledge and information you need, the FAA is eager to hear your suggestions and requests. Send ideas to me at e-mail address below, and watch for a Spring 2005 launch of the first edition!

Susan Parson is an active general aviation pilot and flight instructor who recently joined the FAA as special assistant in the General Aviation and Commercial Division of the Flight Standards Service. Her e-mail address is <susan.parson@faa.gov>.

SPANS – Safety Program Airmen Notification System

Spanning the gap between airmen and the FAA

by James E. Pyles

The Federal Aviation Administration's Aviation Safety Program has been producing safety seminars, pamphlets, advisory circulars, videos, and many other safety related items for years. The U.S. Postal Service has been our primary way to deliver notices about the availability of these items and information about when and where seminars would be held. This method of delivery is very slow and costly. With the growing popularity of e-mail and its magnificent suitability for delivery of this type of information, we have developed the FAA's Safety Program Airmen Notification System or SPANS. A user friendly web site that one can use as merely a place to "see" what events are coming up in your local area or any area throughout the country with just a few simple clicks of the mouse. You may find it more convenient to register with the site and receive this information and important safety alerts right in your e-mail box in a timely manner. It's your choice and our way of spanning the gap between the FAA and our customers.

Since its launch on March 21, 2004, the SPANS site has had over seven million hits and averages over 700 visitors daily. We have been delightfully surprised at its overwhelming success. Over 3,500 seminar registrations have been received. Safety Program seminars in some areas have seen an increase of over 15% in average attendance and all in two short months. The online registration, for most events, has helped the FAA plan better and save resources which can be put into bringing you even more safety events and materials.

What has made it so successful? Airmen have told us that it is not your typical site, hard to navigate and find what you need. Rather it is user friendly and simple in form and function. Many have said it is the timeliness of the information. Almost all have said "it's about time" the FAA has done something to make finding the safety information they need easy, fast, and effortless.

SPANS — Part Of A Larger Effort

SPANS is a part of a much larger effort to bring safety information to you electronicly via the web and e-mail. FAASafety.gov will soon bring you a safety library, aviation-related links, online training on safety topics, and a one-stop shop to order FAA safety-related publications and materials like videos, CD's, and DVD's. We are not trying to compete with the many great organizations that already provide airmen with safety information. Our goal is to bring to you FAA information which will help you fly safely and legally. We aim, at FAASafety.gov, to bring you up-to-date pertinent safety information and span the gap between the FAA and all airmen using the National Airspace System.

A LITTLE MORE ABOUT SPANS

Event Search: This is the heart of SPANS. You can search for events by specifying parameters like Zip Code and mile radius, state, airport, FAA district/region, or keywords. If you are registered on the site, when you log in all events within 50 miles of your home or office will appear on the screen automatically. Or perhaps you are willing to go a little further away from home to gain a little more information on that trip to the mountains you are planning. Simply type in "mountain flying" or similar keywords to find all the events in that part of the country where your topic of choice will be discussed. Pick the event you want to attend and then

register online to receive a reminder of the event delivered right to your e-mail box.

Preferences: Here is where you can customize SPANS to suit your personal needs. Change your e-mail address, password, or which ratings you would like to receive pertinent safety information on. Customize the type of notifications you wish to receive automatically or completely opt-out of the SPANS system.

Local Contact Information: Have you ever wanted to know who your Safety Program Manager was? Or, perhaps a local Aviation Safety Councilor to ask a question of? Do you know which Flight Standards District Office is in your area? You will find this and other items your local Safety Program Manager deems appropriate to add to the list.

Site Suggestions: We are always looking for ways to improve SPANS and FAASafety.gov. This is your opportunity to let us know how we can. First you can let us know what type of seminar information you wish to have in your local area. Or what kind of online training would help you most. Pick from the list of National Emphasis Items or give us your own thoughts and ideas.

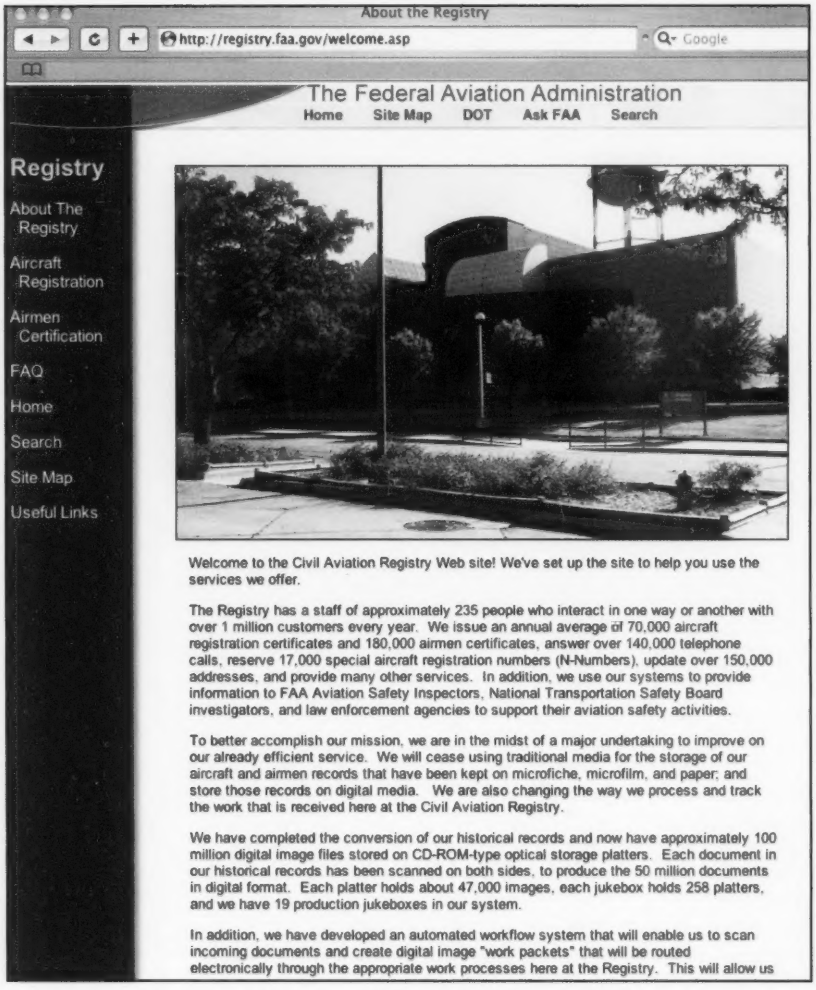
As the Safety Program transitions into the twenty-first century, come make the transition with us. Bring your ideas of how we can help you fly safer and smarter. FAASafety.gov is the place to be. Tell all your friends to bring their ideas with them and let's continue to SPAN the gap between the FAA and airmen. Help us rebuild a new robust safety team by taking part in this great effort to reduce general aviation and all accidents in the greatest airspace system in the world. For more information, register at <www.FAASafety.gov>.

James E. Pyles is the Northwest Mountain Region Safety Program Manager and the FAASafety.gov Team Leader.

Registration Maintenance

Keeping your registration address up to date

by the FAA Aircraft Registration Branch


About the Registry
http://registry.faa.gov/welcome.asp
Google
The Federal Aviation Administration
Home Site Map DOT Ask FAA Search
Registry
About The Registry
Aircraft Registration
Airmen Certification
FAQ
Home
Search
Site Map
Useful Links
Welcome to the Civil Aviation Registry Web site! We've set up the site to help you use the services we offer.
The Registry has a staff of approximately 235 people who interact in one way or another with over 1 million customers every year. We issue an annual average of 70,000 aircraft registration certificates and 180,000 airmen certificates, answer over 140,000 telephone calls, reserve 17,000 special aircraft registration numbers (N-Numbers), update over 150,000 addresses, and provide many other services. In addition, we use our systems to provide information to FAA Aviation Safety Inspectors, National Transportation Safety Board investigators, and law enforcement agencies to support their aviation safety activities.
To better accomplish our mission, we are in the midst of a major undertaking to improve on our already efficient service. We will cease using traditional media for the storage of our aircraft and airmen records that have been kept on microfiche, microfilm, and paper; and store those records on digital media. We are also changing the way we process and track the work that is received here at the Civil Aviation Registry.
We have completed the conversion of our historical records and now have approximately 100 million digital image files stored on CD-ROM-type optical storage platters. Each document in our historical records has been scanned on both sides, to produce the 50 million documents in digital format. Each platter holds about 47,000 images, each jukebox holds 258 platters, and we have 19 production jukeboxes in our system.
In addition, we have developed an automated workflow system that will enable us to scan incoming documents and create digital image "work packets" that will be routed electronically through the appropriate work processes here at the Registry. This will allow us

This is the Civil Aviation Registry web site at http://registry.faa.gov/welcome

Just what is it that keeps your aircraft flying, providing the pleasure of flight or earning its keep? Someone new to aviation might explain the speed of the air over the wings creating lift. Someone that's been around a bit longer may respond, "money and more money." The old timers around the field might chalk it up to dedicated maintenance of both the aircraft and piloting skills. All three are correct, but could there be something other than maintenance of the aircraft, maintenance of piloting skills, and money? Think about it. Need some help? Here's a clue.

We're with the government. Yeah! You've got it. It's the paperwork. You cannot legally operate an aircraft, unless it is properly registered, airworthy, and carrying the required certificates. Being the Aircraft Registration Branch, we want to talk about the registration address in particular and how important it is to keep this up to date. In the extreme, an out-of-date aircraft registration address can ground an aircraft.

The Federal Aviation Administration (FAA) uses the aircraft registration database to distribute safety and maintenance-related information such as *Airworthiness Directives* to the registered owners of aircraft. Aircraft manufacturers use these addresses to send their own safety notices. This database also serves as an important reference when local law enforcement and Flight Service Stations begin the search for a down or overdue aircraft. Aircraft registrations with incorrect addresses have continuously drawn the attention of law enforcement agencies during the twenty-year war on drugs. More recently, registered aircraft with incorrect addresses have become an important issue to law enforcement and other agencies dedicated to protecting our country from terrorism. Keeping an aircraft's registration address current ensures that important safety or security information can be delivered in a timely manner.

The FAA Aircraft Registration Branch does have several programs directed toward helping aircraft owners keep their registration addresses up to date. Twice yearly we compare the registration database against the National Change of Address database. This results in two to five thousand letters being sent to aircraft owners asking them to confirm the change in their aircraft's registration address. We also look at address listings in the FAA Airmen Certification database and at publicly available Internet databases. For many years we have annually sent more than 6,000 mailings to aircraft owners whose aircraft had experienced no registration activity during the previous three years. These mailings are the Triennial Aircraft Registration Reports of which most of you should be familiar. They are sent to verify the status of aircraft. The report is configured, so the aircraft owner can certify that the aircraft is still properly registered or provide notification of an aircraft's sale, destruction, or change of address. Among the slightly more than 334,000 registered aircraft, over 30,000 are flagged because the Triennial report was returned as undeliverable. Surprisingly, more than 8,000 of these aircraft have been flagged just since the year 2000. While the FAA wants all aviation experiences to be as positive and hassle free as possible, it can't achieve this unless it is also meeting its primary responsibility of creating the safest aviation environment possible. Being able to reliably communicate safety issues to aircraft owners is a major part of promoting safety.

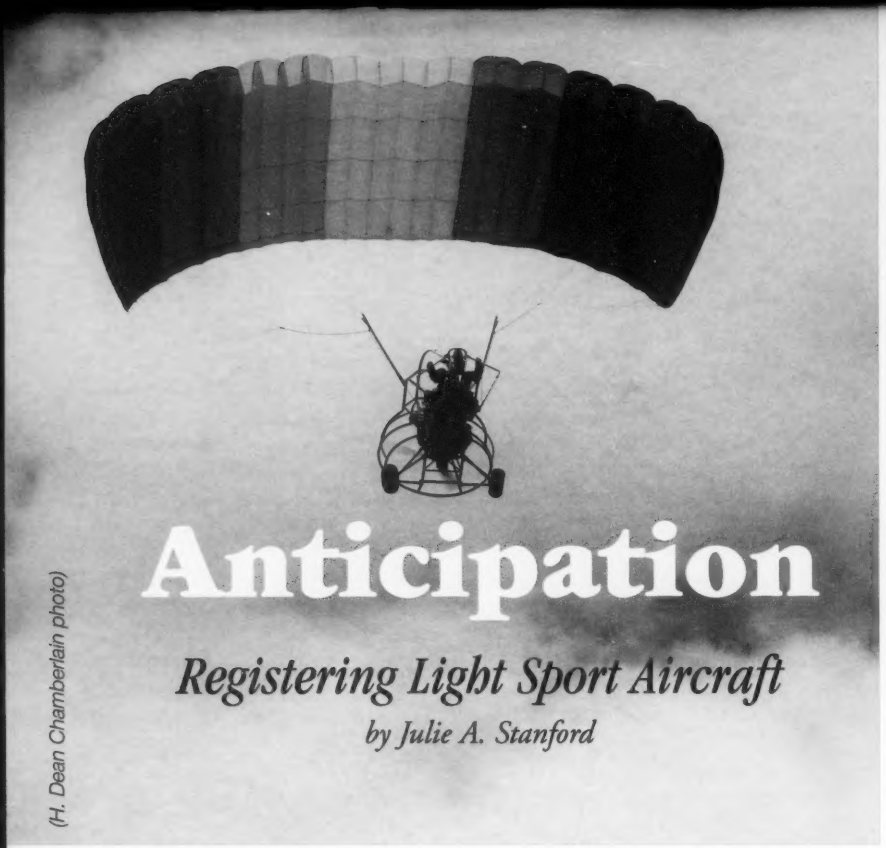
We hope to improve the maintenance of aircraft registration addresses through a continuing awareness campaign. However, this issue is important enough that we will be using all avenues available to us. The Code of Federal Regulations requires aircraft owners to notify the FAA Aircraft Registration Branch of a change in address within 30 days of the change. An aircraft owner is also required to complete and return the Triennial Aircraft Registration Report within 60 days after it is issued. When a Triennial report is returned to the Aircraft Registration Branch as undeliverable, it is apparent that the aircraft's owner has failed to report an address change and failed to complete and submit the Triennial Aircraft Registration Report. Failing to respond under the Triennial program is cause for suspension or revocation of the Certificate of Aircraft Registration. This spring the Aircraft Registration Branch began action on triennial reports returned as undeliverable. If the registered owner does not update the address, the possible results include revocation of the aircraft's registration and cancellation of the N-number assignment. It is important to note that canceled N-numbers will enter two-year administrative hold unless reserved by the aircraft owner immediately after registration certificate revocation. The owner of an aircraft with a revoked certificate or canceled registration may apply for a new registration if they meet the regular eligibility requirements

Check your aircraft registration certificate today and see if the address is up to date. If you don't have the time to run to the airport, you can check by visiting the Civil Aviation Registry's web site at http://registry.faa.gov. After opening the site, click on and enter the Aircraft Registration portion of the site. From the list that is provided click on Interactive Aircraft Inquiry and perform a search using the N-number of your aircraft. Listings for aircraft with known undeliverable addresses and for aircraft whose certificates have been revoked are also available on the web site. Aircraft will be added and removed from the list weekly. If you find that your aircraft is in the clear, check those of your family and friends. With luck you can tell them they are also in the clear, but feel free to politely razz them a bit if they make the list of known offenders.

A change of address may be made by submitting an Aircraft Registration Application, or by letter delivered through regular mail or fax. The letter should identify the aircraft by N-number, manufacturer name, model, serial number, and be signed by the registered owner. The name of the signer should be typed or printed below the signature and the signer's title should be shown when appropriate. If the new mailing address is a post office box or a mail drop you must also include your street address or physical location. A new certificate of aircraft registration will be issued reflecting the updated registration address information. There is no fee for an address change.

For any aircraft registration question, you are welcome to visit our web site, <http://registry.faa.gov>, or call our toll free information line at 1-866-762-9434.

Our fax number is 405-954-3548.



(H. Dean Chamberlain photo)

Anticipation

Registering Light Sport Aircraft

by Julie A. Stanford

There's much anticipation regarding the pending rulemaking "Certification of Aircraft and Airmen for the Operation of Light-Sport Aircraft." While this rulemaking affects the certification and operation of light-sport aircraft and certification of pilots, flight instructors, and repairmen, it must be stressed that aircraft that fit into this "new" category must first be issued a U.S. registration certificate before they are eligible to obtain an airworthiness certificate.

It's believed there are 14,000 or more of these "new" category aircraft that have not been registered and are operating as ultralights. These "fat" ultralight vehicles don't meet the regulatory definition of Part 103 because they are larger, heavier, and faster than specified in that rule. The light sport rulemaking, when effective, will provide a 24-month window in which to register these existing aircraft, as well as a 36-month window (inclusive of the 24-month window for registration) to obtain airworthiness certification. If these existing "fat" ultralight vehicles are not registered within the allowed 24 months, their opportunity to register will vanish.

The Civil Aviation Registry's Aircraft Registration Branch (Registry) will begin accepting Aircraft Registration Applications, AC Forms 8050-1, for light-sport aircraft on the effective date of the final rule. Applications received prior to that date will be returned. Owners of current "fat" ultralight vehicles will be required to submit an Affidavit of Ownership for Light-Sport Aircraft, AC Form 8050-88A, along with their application. This new form will be available prior to the effective date of the rule through the Registry office and on the Registry's website <*http://registry.faa.gov*>. Owners of newly manufactured light-sport aircraft will be required to submit evidence of ownership, such as an ink-signed bill of sale from the aircraft manufacturer.

Applications for registration of light-sport aircraft will be processed by the Registry in the normal course of business, in order of the date of receipt. It is anticipated that the addition of 28,000+ documents (a bill of sale or affidavit of ownership, plus an application for registration for each of the 14,000+ aircraft) will increase the Registry's processing time. The amount of increase in processing time will be determined by the manner in which applications are received. Applicants should be aware that waiting to near the end of the 24-month period to submit their documents could result in greater delays.

The purchaser of an aircraft that has been *previously registered* in the United States can operate for up to 90 days on the "pink" copy of the aircraft registration application form, pending issuance of the new Certificate of Aircraft Registration. The "pink" copy acts as temporary authority to operate the aircraft without registration. There are, however, no provisions for existing aircraft in this new light-sport category to operate on the "pink" copy because they have not been previously registered. Regulations require that once a U.S. aircraft is registered, it must have a valid airworthiness certificate before it may be legally operated. Airworthiness cannot be issued prior to initial registration.

An owner of an aircraft that has not previously been registered in the United States must obtain an identification number (N-number). If the applicant does not request a specific identification number, the Registry will assign the next available number at no charge. An applicant may, however, request that any unassigned United States identification number be assigned. A request for a special number, accompanied by a $10 fee, should be submitted with the applicant's registration documents. A search for available identification numbers may be made on the Registry's web site. The web site is updated each business day.

Please watch the Registry's web site for future information regarding light-sport aircraft. As more information becomes available, updates will be provided.

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Julie Stanford is the Assistant Manager of the Civil Aviation Registry, AFS-700, in Oklahoma City, OK.

Meeting the Safety Challenge

Actions You Can Take Now As a Pilot and Aircraft Owner

by Robert A. Wright

We take our safety mission seriously in the General Aviation and Commercial Division, and a large percentage of our employees are active pilots and flight instructors. Flight training issues are a part of our business and our culture, and we believe that we can make a positive impact in reducing general aviation fatal accidents—by working with the general aviation community. In compiling this issue of the magazine we have solicited a wide variety of views regarding flight training and other general aviation safety issues. We hope that some of the tools, techniques, and methods described in this issue will be of direct use to you in your flight operations.

There are a number of other actions that you can also take right now to improve the safety and utility of your flight operations as a pilot and/or aircraft operator. These actions, taken collectively, can vastly improve your safety success and help the entire general aviation community reach a new safety threshold. While not all encompassing, the following actions can provide a framework for achieving this goal.

1. Participate in a continuing safety education program. It is common now for all professionals to participate in continuing education as an accepted way to stay current and effective. As a pilot, you should do likewise. Participate in the FAA/industry Aviation Safety Program to take advantage of quality safety seminars and proficiency programs, such as the Pilot Proficiency ("WINGS") Program. In particular, you should seek training in risk management procedures from among current training products and programs available. You should stay abreast of current general aviation safety issues by reading current periodicals and other information.

2. Obtain a meaningful flight review. If you comply with the recurrent training requirement through completion of a flight review, take the necessary steps to get your monies worth from the minimum one hour of ground instruction and one hour of flight instruction required by the regulations. Plan to take the review in the aircraft you most commonly use in the type of flying you do. Seek out an experienced flight instructor who knows the equipment you fly, including all the installed avionics, and who takes the time to assess the nature of your flying in structuring a tailored review for your needs. Prepare in advance for the review by coordinating with your instructor and reading or completing any pre-review preparatory materials. If you are significantly changing or upgrading the nature of your flying or equipment, consider a more structured recurrent or transition training program that exceeds the regulatory requirement. For this purpose, ask your instructor to consider using products developed under the FAA/Industry Training Standards (FITS) program, described elsewhere in this issue.

3. Invest in safety equipment and learn how to use it. A new generation of avionics and other technologies is available to vastly improve your situational awareness and to aid you in avoiding restricted airspace and in some cases weather and other hazards. This equipment may be installed in the aircraft, or it may be portable, but as the pilot-in-command, you are responsible for knowing its limitations and the procedures for using it effectively.

4. Conduct adequate preflight planning, even for local flights. The key to a safe and efficient flight is adequate preflight preparation. This includes, but is not limited to, avoidance of restricted airspace and temporary flight restrictions (TFR), obtaining a thorough knowledge of current and forecast weather conditions and expected hazards, determining fuel requirements, calculating takeoff and landing distance and other airport requirements, and obtaining and becoming familiar with relevant *Notices to Airmen* (NOTAMs). This entire process can be improved by using portable computer terminals now installed at many airports that provide graphical and text weather information as well as information on NOTAMS, TFR and other airspace restrictions. This information will greatly improve your picture of the planned flight and supplement or meet the requirement for a weather briefing from a Flight Service Station, Direct User Access Terminal (DUAT) briefing, or a briefing from an FAA approved Internet weather provider.

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U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

JUN 2 1 2004

Dear Pilots:

Following the tragic events of September 11, 2001, the Federal Aviation Administration (FAA) partnered with security interests throughout the Federal Government to reduce the threat of future terrorist activities. One response has been to use Temporary Flight Restrictions, or TFRs, to protect Government leaders and prevent military bases and other national assets from becoming possible terrorist targets. While such restrictions create an added burden for pilots, they are an appropriate and necessary response to threats facing this nation.

I recognize the impact flight restrictions place upon general aviation (GA) pilots. I have received many e-mails from GA pilots complaining that TFRs and other important notices are difficult to locate and interpret. Although we have tried to notify the aviation community of these restrictions, TFR violations continue to be a significant problem.

Let me assure you we are aware of these concerns. We continue to work aggressively to develop and improve our educational and flight-planning tools for pilots. I would like to familiarize you with some resources that can help you stay abreast of current airspace changes.

The FAA's Flight Service System

A call to 1-800-WXBRIEF gives you instant access to air traffic professionals who can provide you with the latest information on flight restrictions throughout the National Airspace System (NAS). Also, pilots enroute can contact Flight Service personnel and request in-flight updates so vital in navigating today's complex airspace.

In addition, by visiting http://tfr.faa.gov/tfr/jsp/list.jsp, you may access an automated system that provides up-to-the-minute information on TFRs. This system presents TFR information in a clear, user-friendly, graphical format. Future improvements to this system will include plain language versions, as well as software enhancements that will allow us to display TFR graphics more quickly.

Preflight Information

By clicking on http://amsrvs.registry.faa.gov/amsrvs/ReqAcct.asp, pilots may register for our e-mail notification system and receive the latest news about airspace status and other safety issues.

We also partnered with industry to provide pilots with valuable preflight information using the Direct User Access Terminal System (DUATS). Available at http://www.duat.com and http://www.duats.com, DUATS provides the latest information on airspace restrictions and weather.

Click on http://www.aopa.org and http://www.eaa.org to access the Aircraft Owners and Pilots Association's (AOPA) and the Experimental Aircraft Association's web-based flight planning tools designed to help steer pilots clear of TFR airspace.

To learn more about flight restrictions, I would recommend you review our latest publication on TFRs, *Airspace Obstacles and TFR Trivia,* available online at http://www.faa.gov/avr/afs/afs800/docs/tfrweb.pdf.

The AOPA Air Safety Foundation also has an excellent web-based program titled, *Know Before You Go*, available at http://www.aopa.org/asf/know_before.

I want to thank all of you who safely and responsibly use our National Airspace System every day. The NAS is one of our most valuable assets, and, as such, we will make every effort to minimize the impact of TFRs on the flying public. But I need your help to reduce airspace violations. Get a briefing before *every* flight, regardless of when or where you operate. TFR violations are everyone's concern, and we must work together if we are to keep our aviation community the world's standard for safety, efficiency, and security.

Sincerely,

Marion C. Blakey

Marion C. Blakey
Administrator

Meeting the Safety Challenge

Actions You Can Take Now As a Pilot and Aircraft Owner

(Continued from Page 37)

5. Conduct a complete preflight inspection of the aircraft. Ensure that the aircraft is in both an airworthy status (including appropriate documents) and capable of safe operation for the flight in question. With respect to the latter requirement, ensure that critical discrepancies are corrected before flight and that inoperative equipment is repaired or properly deferred.

6. Practice active risk management. Before and during the flight, continuously assess the level of risk you are exposed to by evaluating the pilot, aircraft, environmental, and other factors that contribute to risk. This process can be accomplished in a methodical manner with a little risk management training such as that described elsewhere in this issue. Be especially aware of your position in relation to potential aeronautical hazards including weather, terrain, traffic, and restricted airspace. Do not hesitate to cancel or delay a flight that can not safely be made to avoid such hazards and be prepared to divert to an alternate destination during a flight.

In this issue of *FAA Aviation News*, we have focused on flight training as a key means of improving general aviation safety and especially in reducing fatal accidents. Training and education are the key to effectively using the techniques described above, and elsewhere in this issue, to meet the safety challenges we face. The staff of the General Aviation and Commercial Division, together with our other FAA and industry partners, are dedicated to helping the general aviation community rise to this challenge and achieve a new safety threshold.

Robert A. Wright is the manager of the FAA's General Aviation and Commercial Division. He is also a pilot and an aircraft owner.

MY VIEW

by James J. Ballough
Director, Flight Standards Service

By now you have read the comments from the FAA Administrator and others within FAA, as well as comments from some of the leaders in the general aviation community. They have given you their views on the challenges and future of general aviation. I would like to share my thoughts on general aviation. I think these are exciting times for general aviation. We are on the verge of one of the greatest changes in general aviation within recent memory.

For most of the last half of the 20th Century, changes in general aviation were evolutionary rather than revolutionary. For someone who started flying in the mid-1950's or early 1960's, things did not change substantially for most of the last 40 years. During that time, most of your typical smaller general aviation aircraft were made of metal with some made of tube and fabric. To an extent, that is still true today. The standard method of navigation then was pilotage backed up by the then new VOR system. Someone, who had started flying in say 1960, and who then left aviation, could probably walk out on any general aviation ramp in 1980 or 1990 and still recognize your basic two- and four-place general aviation aircraft. But that is not true today.

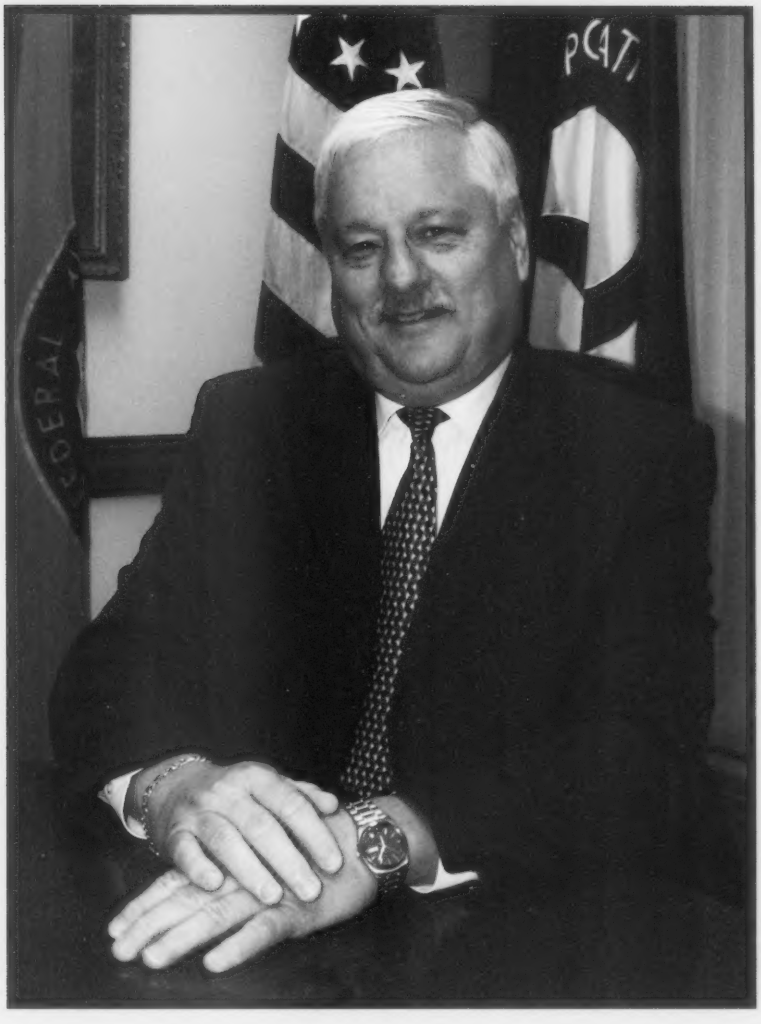
In some cases today, if you walk away from one of the new general aviation aircraft for only a few short weeks, you may have a problem programming some of the new electronic gear, particularly the latest GPS units, installed in some of the new flat-panel equipped aircraft.

General aviation is changing. Today, we have complex avionics such as GPS and flat-panel multifunction displays, composite aircraft, prototype very light jets, and we are on the edge of having more data in the cockpit than we may know how to handle. I think we owe many of these changes to the digital age we live in. Although pilots and engineers may have dreamed of such devices years ago, only today's digital computers have made the changes possible. The challenge now is how to safely operate and maintain this new technology.

Meeting that challenge is one of the goals of the Flight Standards Service. As Flight Standards works with industry developing new training models, operating methods, and new maintenance techniques to support all of the changes taking place in general aviation, Flight Standards itself is changing. This summer, Flight Standards will work to complete its ISO certifications standards. For those not familiar with ISO standards, the standards are a set of internationally recognized procedures and processes that deal with the development of a Quality Management System. Our goal of the Flight Standards ISO 9001 certification process is to ensure that you, our customer, will receive the same high level of service you expect from your government regardless of where you live or which Flight Standards District Office you visit. When fully implemented, the ISO process will standardize how Flight Standards does business across the nation.

In addition to ensuring we meet the highest quality management standards you deserve, the proposed Light Sport Aircraft (LSA) rule, when approved, will provide more flight opportunities for those in general aviation wanting to fly more basic-type aircraft. One major benefit of the proposed LSA rule is the reduction in training costs. As proposed, less training will be needed to train a safe, competent LSA pilot.

And the final comment I wish to make concerns the FAA/Industry Training Standards (FITS) training programs for the new technologically advanced aircraft. FAA and industry both have to be more creative in training tomorrow's pilots today. Because of the complexity of today's airspace and ever changing rules and procedures, tomorrow's pilots must learn things that their grandparents never had to think about. That is why FAA and industry are working together to develop alternative ways to teach pilots how to fly safely in the air space of the future. Am I saying yesterday's training methods were bad? No, I am not saying that. Tens of thousands of pilots have been trained to fly safely using the current methods. What I



(Mario Toscano photo)

am saying is that Flight Standards must consider the needs of tomorrow's pilots, so that the regulations, procedures, and methodologies are in place today to meet those needs of the future.

Like I said, these are exciting times in general aviation. We value you, our customer, and as such, we want to provide you with the very best government has to offer. I ask that you keep an open mind when thinking about some of the proposed changes being made in general aviation and within Flight Standards. I hope you enjoy all that general aviation has to offer. As someone once said, "The best is yet to come."

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